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LETTER

FROM

THE SECRETARY OF THE NAVY,

TRANSMITTING,

In compliance with resolution of the Senate of January 19, the report of Lieutenant-Commander F. E. Chadwick, U. S. N., on the foreign systems of training seamen for the Navy.

JANUARY 21, 1880.—Referred to the Committee on Naval Affairs and ordered to printed.

NAVY DEPARTMENT,
Washington, January 20, 1880.

SIR: In compliance with a resolution of the Senate, of the 19th instant, I have the honor to communicate to the Senate, herewith, "the report of Lieut. Com. F. E. Chadwick on the foreign systems of training seamen for the Navy.

I am, sir, very respectfully,

R. W. THOMPSON,
Secretary of the Navy.

Hon. WILLIAM A. WHEELER,
Vice-President of the United States.

SIR: I beg to acknowledge, through the department, the many kindnesses I met with while abroad in the prosecution of the inquiries ordered.

My thanks are due the Hon. John Welsh, late minister at the court of St. James; General Noyes, minister at Paris; and the Hon. Andrew D. White, minister at Berlin, for the aid most kindly given in bringing me in communication with the authorities whom it was necessary for me to meet.

I am under great obligations in England to Vice-Admiral Phillimore, superintendent of naval reserves; to Captain H. D. Hickley, head of the English naval training system; to Chaplain and Naval Instructor J. B. Harbord, inspector of naval training schools; to Captain Burney, superintendent of Greenwich hospital schools; to Edwin Chadwick, esq., C. B., and Edward Tufnell, esq. (two gentlemen to whose influence the es-

tablishment of the present English school system is largely due), and to all others in official station, whether military or civil, whom I met, for unceasing courtesy and assistance.

In France, my special thanks are due to M. LeBeau, chef du bureau des équipages de la flotte, et de la justice maritime, whose aid was invaluable to me; to Vice-Admiral Bourgois, préfet maritime at Brest, and to all the officers of that station with whom I came in contact.

In Germany, though my visit there was wholly unofficial, my thanks are due to Captain Blanc, chief of the bureau having charge of the recruiting and instruction of boys, and to the officers of the station at Friedrichsort, Kiel, for the great kindness and attention which I received during my visit there.

Very respectfully, your obedient servant,

F. E. CHADWICK,
Lieutenant-Commander, U. S. N.

The honorable R. W. THOMPSON,
Secretary of the Navy.

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INSTRUCTIONS.

NAVY DEPARTMENT,
BUREAU OF NAVIGATION AND OFFICE OF DETAIL,
Washington, May 6, 1879.

SIR: On the receipt of this you will regard yourself on special temporary duty in connection with examining and reporting on the system of training vessels adopted by such governments as in your judgment will be necessary to obtain the information desired.

Full instructions in regard to this duty will be issued you by the Bureau of Equipment and Recruiting, to whom your reports will be made. When completed, you will resume the leave granted you by the department. No travel will be allowed for this duty.

By direction of the Secretary.

Respectfully,

WM. D. WHITING,
Chief of Bureau.

Lieut. Com. F. E. CHADWICK, U. S. N.,
London, England.

NAVY DEPARTMENT,
BUREAU OF EQUIPMENT AND RECRUITING,
Washington, D. C., May 6, 1879.

SIR: Having been informed that you are desirous of examining into the training systems of the English and French naval services, I have requested that orders be sent to you, which will enable you to visit, officially, the different stations where those systems are in operation.

After making what you consider a thorough and complete investigation, you will please report the result to this bureau in time to make mention of it in the annual report to Congress.

Very respectfully, your obedient servant,

EARL ENGLISH,
Chief of Bureau.

Lieut. Com. F. E. CHADWICK, U. S. N.

PARIS, FRANCE, *August* 20, 1879.

SIR: In obedience to orders of the department of May 6, 1879, and to the instructions of the Bureau of Equipment and Recruiting of the same date, I have the honor to transmit the following as my report upon the naval training systems of England and France.

I am, very respectfully, your obedient servant,

F. E. CHADWICK,
Lieutenant Commander, United States Navy.

Commodore EARL ENGLISH, U. S. N.,
Chief of Bureau of Equipment and Recruiting,
United States Navy Department, Washington, D. C.

PART I.

NAVAL TRAINING.—ENGLAND.

PART I.

CHAPTER I.

The English estimates for the naval force in commission for the present year (1879) were for 45,800 officers and men (including the coast guard on shore). These estimates do not include 13,000 marines, 6,200 of whom are ordinarily afloat.

As the disposal of this force may be interesting, I give the following abstract:

Flag officers in commission	16
Superintendents of dock-yards	5
Flag lieutenants and secretaries to above	29
Other persons of their retinue	116

Abstract of employment.

	Commissioned officers.	Subordinate officers.	Warrant officers.	Petty officers, seamen, &c.
For general service	1,430	263	245	20,562
First reserve (used as coast-guard ships)	212	12	56	1,981
Gunnery and training ships	260	177	144	2,959
Receiving and depot ships	587	94	319	3,733
Surveying vessels	81	.....	4	343
Troop ships	189	5	68	1,974
Store ships	21	.....	5	170
Drill ships (for the naval reserve)	28	.....	22	235
Coast guard on shore	93	.....	227	3,830
Boys (including 2,400 under training)	.....	.....	.....	5,305
Totals	2,901	551	1,090	41,092

There are officers employed on—

Special service on shore	89
Unemployed officers	588
Or a total on the active-list of	5,219
The reserve and retired-lists amount to	2,256

NUMBER IN THE SEAMAN CLASS.

In a paper read by Capt. J. C. Wilson, R. N., before the Royal United Service Institution (July 2, 1875), the number of blue jackets, or men of the seaman class, taking the average of several years, is put at 18,683. The number given in the return to the House of Commons, August, 1875 (see Appendix), is 19,283. The former number, however, can be taken

as the usual average, and is about that now employed. The rates into which the men are divided are estimated as follows:

Petty officers	3,942
Leading seamen	1,162
Able seamen	7,143
Ordinary seamen	5,206
Ordinary seamen, second class	1,220

ANNUAL WASTE.

The annual waste in this number amounts to from 11.5 to 14 per cent., so that to keep up this class in the English service there must be annually added to it 2,400 or 2,500 persons. It is the supply and training of these that we have to consider.

Thirty per cent. of this annual waste is occasioned by desertion, entailing a loss to the country of $1,200,000 annually, the cost of training and supporting a man the average time until he reaches a state of real effectiveness as a seaman being computed at $1,500. Every blue jacket thus represents a large money value, apart from his value to the service, obtained by a long course of training and discipline; he cannot be immediately replaced; it takes years of labor and a great deal of money to do it.

Of the 5,305 boys allowed under this year's estimates 2,400 are new entries for training. The remaining 2,905 are those who having passed out of the training ships are either in active service or are awaiting disposal. As these boys on first entry are bound to serve until twenty-eight years of age, and as by serving another enlistment of ten years they are enabled to retire as pensioners, it follows that nearly all the seamen class of the British service are continuous-service men.* As men benefit pecuniarily but little more (as to pension) by any further enlistment, comparatively but few serve beyond their second term. The result is that the English fleet is manned by very young men, none unless they have entered on a third enlistment being over thirty-eight years of age. The boys forming the basis of this force are now all passed through the training ships.

The vessels employed in this service are five line-of-battle ships, each having a brig as tender. There is also attached to each ship a hulk which serves for newly entered boys and for various purposes which shall be mentioned hereafter. These ships, and the number of boys on board (June 23, 1879), are as follows:

Ships.	Where stationed.	Number of boys.		
		First class.	Second class.	Totals.
Impregnable	Devonport	407	499	906
Implacable	Devonport	308	496	714
St, Vincent	Portsmouth	306	316	622
Boscawen	Portland	253	265	518
Ganges	Falmouth	91	263	354
				3,114

*Non-continuous-service men are enlisted for five years, but the number of these is comparatively small, as will be seen by reference to Appendix A.

The excess over 2,400 is accounted for by the fact that many of the boys are retained on board until they are assigned to sea-going ships.

I shall use the Impregnable as the sample ship of the squadron. This is the only one under command of a captain, all the others being commanded by officers of the grade of commander. The captain of the Impregnable is styled the "inspecting captain of training-ships," and has, under the Admiralty, the control of the boys in all the others. All questions relating to the management are referred to him: he makes a quarterly inspection of each ship, regulates the cruising of the brigs, and when the brigs are assembled to cruise in company takes command of the squadron. This important post has been held for the last two years by Capt. H. D. Hickley, who has brought the system to a perfection which it will be difficult to surpass.

The officers of the Impregnable are as follows:

Captain (inspecting captain of training-ships)	1
Commander	1
Lieutenants	3
Chaplain and naval instructor (combined in same person)	1
Staff surgeon	1
Surgeon	1
Paymaster	1
Assistant paymaster	1
Gunners	4
Boatswains	3
Carpenters	3

One gunner and two carpenters are employed on board the Circe, the hulk attached to the Impregnable.

The chaplain has the immediate supervision of the school instruction, and has under him the following staff:

Head master	1
Schoolmasters	10
Pupil teachers	4

There are also fourteen petty-officer instructors, who give instructions in things pertaining to seamanship. These last are men who have passed through the Excellent or Cambridge (gunnery training ships), and make most excellent teachers and drill-masters.

The ship's complement is as follows:

Master-at-arms	1	Yeoman of signals	1
Chief gunner's mate	1	Captain of hold	1
Band master	1	Captain of masts	1
Writers	3	Captains of tops	2
Ship's stewards	3	Signal-men	2
Ship's cook	1	Sick-berth steward	1
Assistant cooks	3	Sick-berth attendant	1
Ship's corporals	7	Seamen and ordinary seamen	20
Gunner's mates	7	Carpenter's mates (eight on duty in Circe)	9
Boatswain's mate	1	Shipwrights (two on duty in Circe)	8
Coxswain	1	Caulker	1
Quartermasters	3		

Sailmaker	1	Plumber's mate	1
Ropemaker	1	Tailors	3
Blacksmiths	2	Barbers	2
Armorer	1	Stewards, cooks, &c	19
Cooper	1	Shoemakers	2

The ship is a three-decker of 3,880 tons. The alterations made to fit her for the service have been to make 70 feet of the after part of the middle deck into a school-room; to make a large drying room for boys' clothing (to be used in wet weather), and a large bath-room on each of the lower decks, with washing and bathing accommodations amply sufficient for the entire number on board. The basins and bath-tubs have water supplied from fresh-water tanks, fresh water being allowed for all purposes, whether for washing the clothing or the person.

The Circe has bath-rooms fitted in the same manner. There is, in addition to all the facilities for bathing and cleanliness on board the two ships, a floating bath moored near by, where details are sent daily to bathe, or to be taught swimming. This bath is the invention of Captain Hickley, and has been generally adopted, both in the training service and for other schools where swimming is taught. It may be described as a trough 50 feet long by 30 broad, the edges of which are made with sufficient flotation to allow the weight of many boys to be borne: the sides, which slope inward, and the bottom are open sufficiently to permit a free flow of water through it: the depth of water inside is about 5 feet. Captain Hickley advises, in the building of any others, to make the edges broad enough to allow houses to be built upon them to afford shelter in dressing and undressing in cool weather. The spars and equipment of the ship aloft are complete. There are thirty-seven boats carried, most of which are fitted for exercise under sail.

The Circe is an old frigate with nothing but the lower masts standing. One deck is fitted as a carpenter shop for training carpenter boys, and the remainder of the ship is devoted to store-rooms. Most of the stores and all the clothing of the training ship are here kept.

CHAPTER II.

REGULATIONS FOR ENTERING A BOY.

The age at which a boy may enter is between fifteen and sixteen and a half years. The latter age is never exceeded. A boy older than this is regarded as too mature to readily take to such a complete change of life as seafaring in most cases demands.

The regulations regarding size are as follows:

Age.	Height.	Round chest.
	Ft. In.	*In.*
Fifteen to fifteen and a half	5 0	30
Fifteen and a half to sixteen	5 1	30½
Sixteen to sixteen and a half	5 2½	31½

The boy when passed is entered to serve for ten years from the age of eighteen. As the term of service is for so many years, great care is taken that he is properly bound, and, being once bound, there is no release without most weighty cause. The State very properly declines losing the support of an individual whom it has educated and supported to an effective manhood.

The recruiting takes place in every part of Great Britain, recruiting sergeants being allowed 10 shillings for each boy recruited. This, however, so far as I can see, is unnecessary at this time, as the supply is far in excess of the demand; it occasions, also, many boys being forwarded who are finally found unfit for the service. The care taken by the authorities, who finally decide upon the boys' qualifications, is extreme. This final examination takes place on board the ship to which they are forwarded, before a board consisting of the commander, a lieutenant, and a medical officer.

In addition to the boys so recruited, a certain number of boys are obtained from the Greenwich Hospital School; band boys are chiefly entered from Feltham Industrial School or from Greenwich. Finally, there are some few entries from mercantile training ships, with which the Admiralty have entered into agreement to take all boys sufficiently trained, who reach the naval standard. In this case the government pays the merchant training ship £25 for each boy as a remuneration for the expense incurred in training him during the time (generally two years) he is on board. Very few of these boys reach the standard.

The lowest mental test for passing is that the boy must be able to read and write, well, a passage of two ordinary lines of words of one syllable. The actual passage read and the specimen of the handwriting are attached to his papers, and forwarded with his other credentials from the recruiting station. Although, from the number of applications

so much exceeding the demand, a higher standard might be made, it is considered undesirable to do so, as many boys of fine physique who are able to read and write a little would be thereby rejected.

The theory governing the rejection of this entirely ignorant, though otherwise good material, is, that minds which have lain so long dormant are much less receptive than those which have received some training, however little. Experience has fully shown this. The necessity for having good material with which to begin will be understood when the remark of an English naval officer of high standing made to myself is considered, that "the English sailor must know now much more than the average lieutenant of thirty or forty years since."

The boy, being admitted, is taken on board the Circe. He here has his his hair closely cut, is given a bath, and is well scrubbed, under the superintendence of a corporal. His clothing is furnished from the ship's stores if found on board of the proper size; if not, the materials are given to contractor to be made. After it has passed inspection, it is taken in charge by the ship's corporal, marked in large letters, and retained until the boy, at the end of the week, is transferred to the training-ship. The bedding which he uses in this interval is that supplied to the ship for the use of recruits, so that, when the transfer takes place, all his own clothing and bedding are in perfect condition. In the meantime, he receives some preliminary drilling; is taught to lash his hammock, and to stow his clothing in the regulation way; is given a daily bath, and is formed, in these seven days, into a very different person from the individual who entered. The change is certainly a most marked one, as I had means of observing.

The allowance of clothing, the expense of which is covered by a gratuity of twenty-five dollars for clothing and five dollars for bedding, is as follows:

2 cloth trousers.
2 cloth caps (with ribbons).
2 serge frocks.
2 drill frocks.
2 duck jumpers } for working suits.
2 duck trousers }
1 serge trousers.
3 flannels.
1 duck bag.
2 check shirts (with collars).
1 haversack.
2 pairs socks.
1 type for marking clothes.
1 ditty box.
1 pair of shoes.
1 neckerchief.
2 combs.
1 knife.
1 pair of scissors.
2 towels.
1 comforter.
2 hats (a black and a white).
1 pair of blankets.
1 mattress.
1 bed-cover.
1 Burney's Manual of Seamanship.
2 pocket handkerchiefs.
3 pounds of soap.
2 sleeping shirts.
1 housewife, to contain the following:
- Clothes brush.
- Scrubbing brush.
- Soap-bag.
- Worsted and worsted needles.
- Ribbon.
- Tape.
- Thimble.
- Wax.
- Buttons.
- Knife-laniard.
- Clothes- and blanket-stops.

The clothing supplied is of excellent quality and well made. It is inspected by the regulating lieutenant, the senior gunner, and a ship's corporal. I noticed that the clothing drawn ready made was quite equal to that furnished specially. Boys, as before remarked, are ordered to stow their clothing in a given way. They are also ordered to lay it out for inspection in accordance with a diagram, which is conspicuously posted about the ship. This greatly facilitates the work of the inspecting officer, and is excellent in teaching the boy methodical habits.

CHAPTER III.

SCHOOL ORGANIZATION.

The whole number of boys in the ship are divided into two schools, termed the upper and lower. To be placed in the upper school the following examination must be passed:

First. Writing from dictation a paragraph from the highest reading-book of the lower school, with no great fault in orthography and in a readable hand.

Second. Reading with intelligence and fluency from the same book.

Third. Working sums in the four simple rules and in reduction (correctly).

A boy takes his place in one of the two schools according to his attainments, irrespective of the time which he has passed on board ship.

The schools are each further divided into two classes each, technically termed "instructions." The fourth and third instructions belong to the upper school; the second and first to the lower.

The upper school is divided into four divisions, one of which only is at school at a time. The lower school is divided into two divisions. This arrangement allows to the upper school two half days' schooling per week; to the lower, four. In the entire year the school hours of the upper school amount to 180; those of the lower to 360.

The upper school is divided as follows:

First division.—First half of the starboard watch.
Third division.—Second half of the starboard watch.
Second division.—First half of the port watch.
Fourth division.—Second half of the port watch.
} Of those belonging in the upper school to these watches.

The lower school divisions are:

First division.—All the starboard watch.
Second division.—All the port watch.
} Of those in this school belonging to these watches.

Seats and desks are arranged in the school-room to accommodate four hundred pupils, this being the maximum number at school at any one time. The school is divided into sections of twenty to twenty-five each, each section being under a schoolmaster or pupil-teacher. The less advanced sections occupy the aftermost desks, the grade rising as they go forward. The method of teaching is that which I have observed in all elementary schools which I visited in England, in which all the pupils of the sections are given the same example, piece of dictation, or words to spell at the same time. As each one finishes his slate is handed to the instructor for marking. There is no individual teaching or individual

recitation except where absolutely necessary, as in reading. That the method is good is shown by the changes produced by the limited training (as counted by hours) allotted them in the year they pass on board. I saw some very remarkable examples. The spelling and writing were especially striking. It brings a great amount of work on the instructor, but the effect on the pupil is certainly good.

The following is the course of instruction:

FIRST INSTRUCTION—LOWER SCHOOL.

Reading and writing from dictation.
Arithmetic as far as multiplication.

SECOND INSTRUCTION—LOWER SCHOOL.

Reading and writing from dictation.
Arithmetic as far as reduction.

THIRD INSTRUCTION—UPPER SCHOOL.

Reading and writing from dictation.
Arithmetic as far as fractions.
Geography.

FOURTH INSTRUCTION—UPPER SCHOOL.

Reading and writing from dictation.
Arithmetic, to include decimals.
Geography.

The school hours in summer are from 9.15 to 11.30 a. m., and from 1 to 3.30 p. m. In winter from 9.25 to 11.30 a. m., and from 1 to 3 p. m. There is also an evening school held on Monday, Tuesday, Wednesday, and Friday from 6.30 to 7.30; a list of the backward and idle boys who are obliged to attend this school is kept hanging in a conspicuous place in the school-room.

The following examination papers, copies of the papers set at the last June examination, show the degree of knowledge a boy is expected to attain:

FIRST INSTRUCTION—LOWER SCHOOL.

1. Express in words 29047.
2. Express in figures fifty-eight thousand seven hundred and five.
3. Add together

```
  9281
 87369
546978
295437
 88521
  4756
```

4. From 7932184
   Take 6495837

5. Write out the multiplication table of 4 and 9 times.
6. Divide 9214672 by 7.
   Write out an account of our Lord's visit to Jerusalem when a boy.

SECOND INSTRUCTION—LOWER SCHOOL.

1. Divide 721493 by 97.
2. A man pays away £47 12*s.* 4½*d.*, £95 16*s.* 11¾*d.*, £125 0*s.* 10¼*d.*, £217 15*s.* 6¾*d.*, and £29 10*s.* 3½*d.*; how much does he pay altogether?
3. From £14,167 10*s.* 1¼*d.*
   Take £9,284 12*s.* 7½*d.*

4. Multiply £876 13*s.* 6¾*d.* by 75.
5. How many £ *s.* *d.* are there in one million threepences?
6. Reduce £360 17*s.* 4½*d.* to half pence.
   Write out the Apostle's Creed and an account of the promise of the birth of our Saviour.

THIRD INSTRUCTION—UPPER SCHOOL.

Arithmetic.

1. On Monday there was received into the Bank of England 120 lbs. 10 oz. 15 dwt. 20 gr. of gold; on Tuesday, 175 lbs. 9 oz. 10 dwt.; on Wednesday, 75 lbs. 6 oz. 17 dwt. 21 gr.; on Thursday, 207 lbs. 11 oz. 18 dwt. 14 gr.; and on Friday, 143 lbs. 4 oz. and 12 dwt.; how much was received altogether?
2. Multiply 10 weeks 6 days 18 hours 20 minutes by 98.
3. Divide 2,400 yds. 3 qrs. 2 nls. by 76.
4. If a bullock weighs 5 cwt. 2 qrs. 10 lbs., how many of the same weight would it take to weigh 27 tons 18 cwt. 3 qrs. 20 lbs.?
5. How many miles, &c., are there in two hundred thousand four hundred and seventy-four yards?

Religious knowledge and geography.

1. Write a biography of Joseph.
2. Describe the healing of the lame man at the gate of the temple.

1. Define an estuary, a headland, a tributary. Name three of each in England.
2. Coasting from Dover to Newcastle, in what general directions will the ships' course be? Mention the counties and chief seaport towns passed.

FOURTH INSTRUCTION—UPPER SCHOOL.

Arithmetic.

1. Divide 19$\frac{3}{22}$ by 41.
2. Multiply 4.063 by 1.02.
3. What is the value of .9375 of a cwt.?
4. Find by practice the value of 5,614 articles, at £3 12*s.* 3½*d.* each.
5. Find by practice the value of 21 yards 3 quarters 3 nails, at £1 16*s.* 5¾*d.* per yard.
6. If 5 men build a boat in 10½ days, in what time would 21 men do it?
7. If 18 horses can carry away 4,500 cwt. of ammunition in 6 days, in what time could 108 horses carry away 90,000 cwt.?

Religious knowledge and geography.

1. In St. Luke, third chapter, the following persons are mentioned: Tiberius, Caiaphas, John, Esaias, and Abraham. State briefly who these persons were.
2. Give our Lord's explanation of his parable of the sower.

Geography.

1. Name the principal harbors and anchorages used by our ships belonging to the Mediterranean fleet.
2. Draw a map of England south of the Humber.

Examinations are held in March, June, September, and December. Those of the schools are conducted by the chaplain and instructors; the seamanship examinations by a lieutenant and boatswain; the gunnery examinations by the gunner and gunnery instructors (petty officers).

A complete record of these examinations is kept in the "Record of progress" book. I may state here that a boy's progress is most carefully noted, almost as much so as that of a cadet at Annapolis.

The inspector of naval training schools (*i. e.*, of the schools proper), the Rev. J. B. Harbord, chaplain and naval instructor, makes a yearly examination of the schools in June. The inspection made by this gentleman and his assistants is rigid and searching, each boy being personally examined in reading—a great work, when it is understood that there are three thousand to be so examined. This *viva voce* examination is preceded by the written examinations on all the subjects studied, conducted by the chaplain and instructors. There are two sets of papers made out on each subject of the same degree of hardness, and care is taken that adjacent boys do not get the same paper. All these papers are printed, and each boy is furnished with a copy; a much better system than that of putting the subjects upon a blackboard. The work must be done *in ink* on the sheet of paper to be handed in. No erasures or working on rough sheets are allowed, so that the examination is a test both of the boy's neatness and care and of his ability. All the papers worked at this examination are, after being marked by the instructors of the ship, forwarded for final inspection to the office of the inspector at the Admiralty, and are there reinspected. The neatness and carefulness shown in most of the papers were very remarkable, the handwriting in almost every case of the fourth-instruction boys (the highest) good, and the spelling excellent, far better than that which I have been accustomed to see in boys of the same age elsewhere, and I should say much better than that of the young men who come up for entry at Annapolis, unless there has lately been an improvement.

To pass to the rating of a first-class boy: A boy must be up in all practical studies, must stand well in school, and must have received a good report from the training-brig.

All boys belonging to the Church of England are required to be able to repeat the Church of England creed and their "duty to God and their neighbor" within two months after entry. The chaplain, however, is not to enforce the catechism of the Established Church upon boys of another persuasion; nor are boys obliged to read books to which they object on religious grounds. The captain in every instance must satisfy himself of the validity of this objection.

CHAPTER IV.

PRACTICAL TRAINING.

The instructors in this are petty officers, who have passed through the gunnery ships Excellent or Cambridge. They are fully up in the details of all drills, and make excellent drill-masters. They ordinarily have command of the companies when landed for battalion drill; act as inspecting officers at morning inspection; and have, in fact, the *onus* of carrying out most of the detail work in practical training.

There are also four "instructions" in this as in the schools. The details of each "instruction" are printed, and the portion which each instructor teaches is found in the back of his class-book, so that he may not deviate from the given course. While in sections, he teaches the subjects of this list and no others. This system secures absolute uniformity; there is nothing left to the caprice of individuals. One may thus be quite sure that the boys turned out by one ship are the duplicates of those from another. As a boy is never passed out of one "instruction" until he has learned *all* the subjects of that instruction, the amount of a boy's knowledge is readily known by a glance at the subjects he has "passed out of." The instructors keep careful note in their class (or section) books of each boy's progress from day to day.

The models are good, but by no means equal to those of Greenwich Hospital School, where, of course, there is much more space for such things. There are excellent models of masts and rigging; of the methods of working anchors; for showing how to steer by compass, &c. All the models have the names of the different parts clearly painted on them, so that there is no chance of a boy's failing to know if he looks. On the monkey topsail are painted the names of all the parts of the sail in large letters; the hammocks used for instructing how to stop a hammock on to the lines have the instructions painted on them; and so with all the others. The dullest understanding cannot go astray.

That there should be a class of petty officers in the English service capable of acting as instructors to these boys speaks volumes for the system. It is not that they must merely be able to tell them the names and uses of things; they must be able to take charge of and discipline their sections, and be officers in every respect but in name. They exactly fill the position here that a non-commissioned officer does in the Army; and are able to direct not as mere leading men, but as men of authority. The want of such a class has always been felt in our own service, and must be felt until we have enough trained and educated men to fill such positions.

I give the subjects of the "instructions" as they are given to the boys in section. These lists are framed and hung about the ship in conspicuous places.

FIRST INSTRUCTION.

First Section.

To be able to sling a hammock, plaiting up the ends of the nettles.
To hang a hammock up, secure the laniard properly.
To lash a hammock up and know the number of turns to take with the lashing, except for night-quarters, or if the fire-bell should ring.
To stop a hammock or a piece of clothes on a girtline.
To fold up each piece of clothes for stowing in a bag, and to lay out a whole kit for inspection.
To put in clothes' stops, and becket the ends back in jumpers, &c.
To fold up bed, blanket, and bed-cover for inspection.
To hold a clean hammock for inspection.
To scrub a hammock and wash clothes.
To mark clothes and bedding.

PARTS OF THE SHIP.

To learn the names of, and be able to point out, the following:

Upper deck.
Main deck.
Middle deck.
Lower deck.
Orlop deck.
Quarter deck.
Forecastle.
Waist.
Poop.
Hold.
Under the half deck.
Davits.
Starboard side.
Port side.
Midships.
Gangways.
Bow.
Stem.
Stern.
Quarter.
Cutwater.
Knight heads.
Figure head.
Cat heads.
False keel.
Main keel.
Keelson.
Billboard.
Gripe.
Bends.
Counter.
Bulwarks.
Waterways.
Hammock nettings.
Bilges.

SHIP'S FITTINGS.

Hawse holes.
Chain pipes.
Bitts.
Compressor.
Capstan.
Hatchways.
Gratings.
Coamings.
Scuttles.
Scuppers.
Manger.
Bucklers.
Bollards.
Spider.
Goose neck.
Fife rail.
Belaying pins.
Cleats.
Fish davit.
Bumpkin.
Chains or channels.
Chain plates.
Stanchions.
Shelf piece.
Knees.
Carlings.
Cant pieces.
Bulkhead.
Ring bolt.
Eye bolt.
Port sill.
Quarter gallery.
Hammock cloth.
Stern walk.
Monkey chains.
Companion ladder.
Accommodation ladder.

Second Section.

MASTS AND YARDS.

To know the names of, and be able to point out, the following:

Lower masts.
Top masts.
Top-gallant and royal masts.
Trysail masts.
Bowsprit.
Jib-boom.
Flying jib-boom.
Dolphin-striker.
Sprit-sail-gaff, or whisker-gaff.
Spanker-gaff.
Trysail-gaff.
Studding-sail.
Spanker-boom.
Housing.
Hounding.
Mast head.
Cheeks.
Hounds.
Trestle-trees.
Fishes.
Cross-trees.
Top.
Top rim.
Sleepers.
Cap.
Capshore.
Wedges.
Mast-head battens.
Bed of the bowsprit.
Bees of the bowsprit.
Saddle of the jib-boom.
Saddle of the spanker-boom.
Jaws (of a boom or gaff).
Lightning conductor.
Bolsters.
Rubbing-paunch.
Heel of mast.
Head of mast.
Fid hole.
Sheeve hole.
Fid.
Preventer-fid.
Lower yards.
Topsail yards.
Top-gallant yards.
Royal yards.
Studding-sail yards.
Slings of a yard.
Quarters.
Yards arms.
Boom iron.
Clamping, or inner boom irons.
Snatches for top-gallant sheets.
Fishes.
Tye-bands.

STANDING RIGGING.

To know the names of, and be able to point out, the following:

Stays.
Shrouds.
Backstays.
Bobstays.
Bowsprit shrouds.
Guys.
Martingale.
Gammoning.
Collars (on bowsprit).
Futtock shrouds.
Laniards (of rigging).
Mast-head pendants.
Burton pendants.
Ratlines.
Back ropes.
Jumpers.
After jib guy.
Heel chain.
Crupper chain.
Jackstays.
Footrope.
Stirrups.
Flemish horse.
Parrel.
Trusses.
Slings of a yard.
Necklace (on lower mast).
Necklace (on topmast-head.)
Top-gallant rigging falls.
Sheer pole.
After swifter.
Catch ratline.

SAILS.

To know the names of, and be able to point out, the following:

Courses.
Top sails.
Top-gallant sails.
Royals.
Flying-jib.
Jib.
Fore-topmast stay-sail.
Stay-sails.
Spanker.
Gaff-topsail.
Lower studding-sail.
Fore-topmast studding-sail.
Top-gallant studding-sail.
Cloth.
Head.
Leech.
Luff.
Foot.
Clew.
Tack.
Sheets.
Bunt.
Cringles.
Robands.
Head earings.
Reef earings.
Eyelet holes.
Tabling.
Bowline bridle.
Buntline foggles.
Reef tackle patch.
Reef tackle pendant.
Buntline cloth.
Reef bands.
Belly bands.
Top lining.
Goring cloth.
Roach.
Mast-lining.
Slab.
Bunt-becket.
Marline on foot.
Bolt rope.
Fore side of a sail.
After side of a sail.
Port side of a fore and aft sail.
Starboard side of a fore and aft sail.

To work on the monkey topsail-yard, as follows:

To loose.
To furl.
To unbend.
To bend.
To reef.
To shake out reefs.

THIRD SECTION.

PULLING, &C., IN SLOW TIME.

To know, and to be able to point out, the parts and fittings of a boat.

To get out oars.
To give way by numbers.
To lay on oars.
To toss oars, as a salute.
To toss oars, coming alongside.
To lay in oars, coming alongside at sea.
To get out bow oars.
To lay in bow oars.
To use the boat hook.
To shove off.
To get fenders in and out properly.
To back and hold water.

PARTS AND FITTINGS OF A BOAT.

Gunwale.
Thwarts.
Stern sheets.
Stern benches.
Poppets.
Rowlocks.
Slings.
Steadying line.
Rudder lanyard.
Head sheet.
Back-board.
Bottom-board.
Painter.
Lazy painter.
Grapnel.
Stretcher.
Clamp (for mast).
Step.

SECOND INSTRUCTION.

FIRST SECTION.

BENDS AND HITCHES.

To know the names, use of, and be able to make the following:

Half hitch.
Timber hitch.
Clove hitch.
Roband hitch.
Rolling hitch.
Round-turn and half hitch.
Running bowline.
Bowline on a bight.
Sheet bend.
Double sheet bend.
Reef knot.
Sheep shank.
To mouse a hook.
To put a strop on a rope.
To put a strop on a spar.
To know the use of a parbuckle.
Inside clinch.

Marling spike hitch.
Blackwall hitch.
Single and double fisherman's bend.
Studding-sail halliard bend.
Catspaw.
Swab hitch.
Bowline.
Figure of eight knot.
Overhand knot.
Carrick bend.
Two bowlines bent.
Two hawsers half-hitched and seized.
Ropeyarn knot.
To pass a stopper.
To sling a cask.
To sling a cask on end.
To sling a grating.
To lower a man down from aloft.
To take a turn round a cleat.
To put on a top-gallant purchase.

Second Section.

COMPASS.

To know the use of and how to box the compass.
To explain the construction of the compass card.
To give the number and names of the points.
To give the names of the half and quarter points.
To point out the lubber's mark, or point.
To name opposite points.
To show by a globe the meaning of going *North, South,* or in any other direction.

Third Section.

LEAD LINE.

To know and be able to point out the following:

Lead and line.
Size of lead line.
Length of lead line.
Weight of lead.
Shape of lead.
Arming of lead.
From which end is a lead line marked?
Name the marks.
Name the deeps.
How are soundings called?
Where is the lead hove from?
How to hold in lead line in heaving.
Explain the use and make of breast ropes.
Explain the use and make of aprons.
Explain the use and make of deep-sea lead.
How is deep-sea lead marked?
To be able to heave the lead from the mortar boat.
To call soundings.

THIRD INSTRUCTION.

First Section.

KNOTS AND SPLICES.

To be able to make and explain the use of the following:

Eye splice.
Short splice.
Long splice.
Grummet.
Wall knot.
Stopper.
Matthew Walker.
Spritsail-sheet knot.
Diamond knot.
Wall and crown.
Shroud knot.
Salvage strop.
Standing Turk's head.
Flemish eye.
Cut splice.
Lashing eyes.
Horseshoe splice.
Point a rope.
Graft a splice.
Puss a seizing.
Four-stranded splice.
Work knots and splices in left-handed rope.
Splice cable-laid rope.

To be able to worm, parcel, and serve a rope, and to explain the use of the following:

Worming.
Parceling.
Serving.
The serving mallet.
How spun yarn is made.
How nettle stuff is made.
To parcel a pair of shrouds.
To put parceling on a shroud to prevent chafe.

To be able to make and explain the use of the following seizings and whippings, &c.:

Cross seizing.
End seizing.
Quarter or flat.
Racking.
Throat or round.
Rose lashing.
Seize in a block.
Common whipping.
American whipping.
West country.
Whipping for sennit.
Sailmaker's whipping.

To know the names and use of the following blocks:

Parts of a block.
- Shell of a block.
- Sheave of a block.
- Bouche of a sheave.
- Pin.
- Head.
- Arse.
- Swallow.
- Score.

Common block.
Single block.
Double block.
Clump block.
Brace block.
Shoulder block.
Fiddle block.
Long tackle block.
Sister block.
Strop-bored block.
Snatch block.
Swivel block.
Iron-stropped block
Gin block.
Hanging block.
Fly block.
Tye block.
Dead eye.
Heart.

To know the names and use of the following ropes:

Yarns.
Strands.
Hawser-laid rope.
Shroud-laid rope.
Cable-laid rope.
Shroud hawser,
Spun yarn.
Nettle stuff.
Sunnit.
Foxes.
Spanish fox.
Junk.
Rounding.
Oakum.
Rum bowline.
Twice laid.
Six-thread stuff.
Coir rope.
Hide rope.
Length of a coil.
How size is measured.
Rope for standing rigging.
Rope for running rigging.
Rope for gun gear.
Left-handed rope.
Size of the rope to reeve through the different blocks.
Use of hawsers.
Why hawsers are so made.
Use of cablets.
To know which end of a coil of rope should be taken out first.

Second Section.

COMPASS, &C.

To be able to take the wheel at the model and explain the following points connected with the compass bearings and the rule of the road, and the meaning of the following terms, &c.:

The bearing of an object.
Direction of the ship's head.
The number of points a ship will lie from the wind.
How many points from the lubber's mark in tacking or wearing?
Keep away.
Luff.
No higher.
Very well thus.
Starboard.
Port.
Steady.
Helm amidships.
Keep her away—points.
Bring her up—points.
Ships meeting, close hauled, which gives away?
Ships meeting, one going free, which gives away?
Rule of the road in boats.
Steering in a tide-way.

Starboard tack.
Port tack.
Weather side.
Lee side.
Tacking.
Going about.
Staying.
Missing stays.
Wearing.
Beating to windward.
To weather.
On a wind.
By the wind.
Close hauled.
Full and by.
Wind abeam.
Wind on the quarter.
To bear up.
Off the wind.
Going free.
Sailing large.
Running.
Before the wind.
Scudding.
Conning a ship.
Keep her away.
Bear up.
Luff.
Steady.
Very well thus.
Nothing off.
No higher.
Starboard the helm.
Port the helm.
Hauling to the wind.
Hove to.
Lying to.
Making a stern board.
Stern way.
Lee way.
Brought by the lee.
Broaching to.
Weather tide.
Lee tide.
Bearing (of an object).
Before the beam.
Abaft the beam.
Abeam.
On the bow.
On the quarter.
Astern.
Boxing off.
Aback.
Wake of a ship.
Lee way.

Third Section.

BRIG MODEL.

To know the names, lead, and use of the following running rigging :

Royal braces.
Top-gallant braces.
Topsail brace.
Fore braces.
Preventer main brace.
After main brace.
Cross jack brace.
Royal lifts.
Top-gallant lift.
Topsail lifts.
Fore lifts.
Main lifts.
Cross jack lifts.
Royal sheets.
Top-gallant sheets.
Topsail sheets.
Fore sheets.
Main sheets.
Jib-stay reeving line.
Jib lacing.
Hanks.
Royal clewline.
Top-gallant clewline.
Topsail clewlines.
Clew garnets.
Fore tack.
Main tack.
Royal yard rope.
Royal halliards.
Top-gallant yard rope.
Top-gallant buntlines.
Top bowlines
Foie bowlines.
Main bowlines.
Topsail bowlines.
Fore buntlines.
Main buntlines.
Top-gallant buntlines.
Leech slab lines.
Topsail reeftackles.
Reef buntons.
Peak halliards.
Throat halliards.
Spanker brails.
Spanker on thawl.
Boom topping lift.
Boom sheets.
Tack tackle.
Tack tricing line.
Flying-jib halliards.
Jib halliards.
Fore-top staysail halliards.
Flying-jib down haul.
Jib down haul.
Fore-top staysail down haul.
Flying jib sheets.
Jib sheets.
Fore-top staysail sheets.

BENDING AND SHIFTING SAILS.

FOURTH INSTRUCTION.

First Section.

To be able to make the following mats, sennits, &c. :

Paunch mat.
Sword mat.
Form the eye in making a harbor gasket.
Thrum a mat.
Common sennit.
French sennit.
Square sennit.
Coach whip.
Cross point.
Hammock clews.
Boats' fenders.
Straw sennit.
Potato net.
Put a mat over lanyards of lower rigging.

To be able to fit rigging as follows :

Rigging, fitted with an eye-splice.
Rigging, fitted with a fork and two lashing-eyes.
Rigging, fitted with a throat seizing on a bight.
Rigging, fitted with a cut splice.
Rigging, fitted with a horseshoe splice.
Rigging, fitted with a half-crown.
Rigging, fitted cutter stay fashion.
Rigging, fitted with end turned up.
Rigging, fitted with wooden dead-eyes.
Rigging, fitted with iron dead-eyes (new pattern).
Top-gallant and royal rigging and stays.
Where single strops are used.
Where double strops are used.
Where two single blocks are used.
Clothing a bowsprit.
Fitting bobstays.
Rigging a lower yard.
Rigging a topsail yard.
Rigging a top gallant yard.

Second Section.

ANCHOR MODEL.

To be able to point out and name the following parts of anchor and cable, &c. :

Ring.
Stock.
Crown.
Shank.
Arms.
Flukes.
How cables are marked at each shackle.
Which end of a shackle is inboard.
Difference between a cable and an anchor shackle.
Bringing to a hawser.
Bending a buoy rope.
Bull rope.
Stowing an anchor.
Second catting an anchor
Parts of a capstan.

Bill.
Forelock.
Shackle.
Swivel.
Link.
Stud.
Slip stopper.
Deck stopper.
Compressor.
Controller.
To bend a buoy rope.
Length of a chain cable.
Cable's length.
No. of shackles in a cable.
Length of a shackle.
Where swivels are placed.
Use of swivels.
How bolt, pin, and pellet are kept in their places.
Messenger.
Messenger shackles.
Securing a cable.
Bringing to cable.
Heaving in cable.
Securing of inner end of cable.
Stream anchor.
Kedge anchor.
Swifter, and pass one.
Anchor shackle.
Sheet hawse hole.
Bower hawse hole.
Stream cable.
Heaving in a stream cable.
Whelps.
Pauls.
Passing nippers.
Racking turns.
Cat back.
Cat.
Fish.
Single anchor.
Moored.
Mooring swivel.
Moorings.
Short stay.
Foul hawse.
Veer cable.
Surging.
Warping.
Kedging.

Third Section.

MODEL ROOM.

To know the names, and describe the uses of the following purchases, tackles, &c.:

Single whip.
Double whip.
Runner and tackle.
Runner (for topmast rigging).
Spanish burton.
Luff.
Tail jigger.
Gun-tackle purchase.
Quarter tackle.
Sail tackle.
Top burton.
Yard tackle.
Mizzen burton.
Top-gallant halliard purchase.
Royal hallaird purchase.
Purchases on a fore or main lift.
Stay tackle.
Top tackle (pendant).
Top tackle (falls.)
Use of a lift jigger.

To be able to explain the method and purchases employed in setting up rigging and staying mast.

Tackles used in setting up lower rigging.
Tackles used in setting up fore or main stays.
Method of staying lower mast.
Method of setting up lower rigging.
Method of bringing to a laniard.
Method of staying topmast.
Method of setting up topmast ring.
Tackles used in staying topmast.
Tackles used in setting up topmast rigging.
Method of setting up top-gallant rigging and backstays.
Method of setting up bobstays.
Marking rigging for ratlines.
Putting on ratlines.
Securing spars for sparing down.
Boatswain's toggle.
Commander.

FITTING OUT AND STRIPPING SHIP.

Sail Making.

To be able to do the following:

Sew a seam (flat, round, middle).
Work an eyelet hole.
Work a cringle.
Make a sailmaker's splice.
Put a bottom in a bag.
Tabling.
Marl the footrope to a topsail and course.

Sailing Launches and Cutters.

Heaving the lead and calling the soundings.
Steering with a wheel.
Working the launches under sail.
Working a dipping lug in a cutter.
Getting mast up and down.
Reefing boat's sails.
Shaking out reefs.
Making tow-ropes fast.
Laying out hawsers.

The sail drills are laid down in the routine appended; the exercises with the masts and sails are very constant, so that a boy even before

going to the training brig becomes quite proficient aloft. I was witness to the general sail drill on board the St. Vincent, a model drill in every respect. I heard no boy speak, nor did I hear an order given in a loud tone by any one excepting by the officer of the deck. The petty-officer instructors were stationed in different parts of the ship to superintend; this superintendence was noiseless, however, the boys being directed by a motion of the hand, or, when it was absolutely necessary, by a word spoken in a very low tone and heard only by those for whom it was intended.

There are thirty-seven boats attached to the ship, all but four of which are large and fitted with sails. In summer one watch of boys is exercised daily at sailing and pulling. Some of the larger cutters are furnished with a wheel, and boys are taught to steer by compass.

Swimming forms a most important part of the boys' exercise. Every one must learn to swim before passing out of the training-ship. The swimming bath has been described; either in this or a slightly modified form it has been adopted by all the government schools.

CHAPTER V.

GUNNERY AND SMALL-ARM INSTRUCTION.

Light smooth-bore guns with the old four-truck carriages are used for gun drill. They are retained, as the chief object is one of drill simply. The more elaborate training takes place at the end of the course in the gunnery-ship, the boys being transferred to this ship for ten weeks: they are here exercised in a general course of gunnery. The drill with smooth-bore guns on board the gunnery-ship has its practical application also afloat, as there are still over 800 smooth-bore guns mounted in cruising ships of the English service. The drill at general quarters which I witnessed on board the St. Vincent was very fine and spirited. The Circe has a battery for the use of the boys of the Impregnable, with which they do their target firing. There is a drill of this kind on Saturday mornings, and frequent exercises with powder take place at other times, so that they are early habituated to gun practice.

The small-arms, infantry, and cutlass drills were excellent. There seemed to be no dislike on the part of the boys to learning this part of their profession. The part taken by the sailors of the fleet in the Zulu campaign will go far towards removing any remaining prejudice against making a seaman able to handle a musket, either in the minds of seamen or officers.

Frequent landings as a battalion take place, and on the last anniversary of the Queen's birthday 800 boys were landed and paraded with the garrison at Plymouth, going through all the movements of the review, which included many difficult ones, in a way to elicit the highest praise.

The final gunnery course of ten weeks is as follows (given on board the gunnery ships):

	Weeks.
Gun drill	4
Small-arms	4
Arming boats	1
Resumé and examination	1

The hours of instruction are from 9 a. m. to 11.30 a. m.; from 1 p. m. to 3.10 p. m.

Course in great guns.

	No. of days.
Preliminary drill	7
Firing (the 9-pounder muzzle-loading rifle-gun being used)	2
Practice, 1 day clearing for action; 1½ days independent firing; 1 day broadside firing; 1 day lowering port; 1 day shifting breeching; 1½ days preparing for examination	7
Firing 64-pounder muzzle-loading rifle-gun on slide	2
Examination	2
Total to extend over four weeks	20

Each day's instruction begins with a lesson, which lasts a quarter of an hour.

First lesson.—Parts of carriage.

Second lesson.—Parts of slide.

Third lesson.—Sights and scale.

Detail of instruction in small-arms.

From first to fifth days:
From 9 to 10.30 a. m.—Manual of arms.
From 10.40 to 11.30 a. m.—Field exercise.
From 1 to 2 p. m.—Field exercise.
From 2 to 3.10 p. m.—Manual of arms.
From sixth to ninth days:
From 9 to 9.30 a. m.—Position drill.
From 9.50 to to 10.30 a. m.—Aiming drill.
From 10.40 to 11.30 a. m.—Field exercise.
From 1 to 1.30 p. m.—Position drill.
From 1.30 to 2 p. m.—Aiming drill.
From 2.5 to 3.10 p. m.—Position drill.
Tenth day:
A. M., as for "6th to 9th," p. m.—Blank firing.
From eleventh to fifteenth days:
A. M.—As for "6th to 9th."
P. M.—Ball practice.
Musketry instruction.
From sixteenth to eighteenth days:
A. M.—As for "1st to 5th."
P. M.—Pistol drill and firing.
Nineteenth day:
Examination.
Twentieth day:
A. M.—Examination; p. m.—Manual quarters.

Detail of boat instruction.

	Days.
Arming launch	½
Firing from launch	1
Arming gun-cutter and rocket-cutter	1
Firing rockets	½
Working Gatling gun	½
Gatling gun firing	½
Firing from cutter	½
Manual quarters	½
Total	5

Detail of the week's examination.

	Days.
Resumé	2
Examination	3

SIGNAL BOYS.

These boys are taken from those of the upper school who have been on board between five and nine months. They are all volunteers: they

are divided into four classes, and are instructed in signals during the time the remainder of their watch is at school. The watch of signal boys also have instruction in the evening with Colomb's signal lights. The course of instruction is as follows:

First class.—To learn the shape and colors of all flags and pennants in use in Her Majesty's navy, including the international code, the use of the "substitute" in ships and boat signal books; to be able to describe the national colors of all nations; to be able to make and take in signals by flags, and pick out their meanings from signal books.

Second class.—To have a thorough knowledge of the semaphore; to know Colomb's cards by rote; to be able to make and take in flashing-light signals, with or without apparatus; to know how and where to place the brackets and gibbets; to be able to work the disk; to know the fog signals by sound with horn, bugle, or steam-whistle; to know speed signals by day or night.

Third class.—To know the various methods of night signaling (not Colomb's) in use, the rigging and fitting of signal yards, the lanterns, &c.; the use of rockets, blue lights, position lights, &c., as to carrying out orders conveyed by night signals; to know the lights carried by steamers and sailing vessels under all circumstances; to be able to tell the direction of a ship's head by her lights.

Fourth class.—To know the organization of squadrons and fleets by columns, divisions, &c., and their distinguishing flags; to know the various classes of vessels in the royal navy by their rig; to be able to cut out and make or mend flags and pennants; to know how to keep a rough signal log; to practice the use of the glass in looking at distant objects, and to estimate distances.

Boys must pass through the first three of these classes before being rated "signal boys." After having passed out of the training ship, they are transferred with that rate to a sea-going ship. There are in the service four rates of signalmen (including that of signal boys), the pay of the highest being the same as that of a coxswain.

The number of boys rated annually is, under the present order, as follows:

From the Impregnable	7
From the Implacable	8
From the St. Vincent	6
From the Boscawen	6
From the Ganges	5

There is thus a total of 32 boys supplied annually to the navy, who when first sent afloat are expert signalmen. Before leaving the ship they have had such a course as could hardly be given them in any sea-going ship in general service.

BAND BOYS.

Each ship educates a certain number of band and bugle boys, who serve as the ship's band while aboard, and are, after attaining a certain proficiency, transferred for general service.

These boys are entered not under fourteen years of age. They must come with a certain degree of musical education, and must be able to read and write. The greater number come from Greenwich school, some being also received from the great industrial school at Feltham. The band boys while in the training ship attend school with the others;

the time allotted the others for practical exercises is used in their case for music practice. The entire number allowed in the five ships is 106, 26 of whom are in the Impregnable. They are well uniformed in the dress lately adopted for bandsmen in the British service. They enter to serve until twenty-eight years of age, under the same conditions as other boys.

CARPENTER BOYS.

One deck of the Circe is fitted as a carpenter's shop, where fifty boys are under training as carpenters. These boys are all volunteers from among the other boys of the training ship. They are, after being chosen, sent on board the Circe for the remainder of their course. The system is a new one and still on trial. At the age of sixteen, if they pass an examination, they are rated first-class carpenter boys, and at eighteen second-class carpenters. At this age they are transferred for work in the dock yards, where they continue their training, or are drafted afloat as necessity arises. Each boy on entering the Circe has a small kit of tools furnished him by the government; he retains this on probation, but if at eighteen he passes his examination it is made up to a full kit and is given him as a gratuity.

Two carpenters, ten carpenters' mates, and one painter are employed as instructors. Of course a great deal of employment is found for these men in work for the two ships and in keeping in repair the great number of boats in use, so that the school makes a certain return for the expense attending it.

TRAINING-BRIGS.

There are five brigs used for practical training, of about 500 tons each; one is attached to each training-ship. They are kept at all times in commission, being overhauled and refitted by the permanent crew during the winter months. There has just been built a new brig to replace an old one. They are required to be ready for sea by April 1, on which day they may begin cruising. They are handsome little craft, carrying their complement of about one hundred and thirty people, comfortably.

The *personnel* on board is as follows:

Lieutenant commanding.
Sublieutenant, navigating sublieutenant (during cruising months only.)
Surgeon.
Boatswain.

Ship's steward	1	Carpenter's mate	1
Ship's cook	1	Sailmaker's mate	1
Ship's corporal	1	Leading seamen	2
Gunner's mate	1	Seamen	6
Boatswain's mate	1	Stewards and servants	7
Captain of forecastle	1	Boys (about)	100
Quartermasters	2		
Captain of fore-top	1	Total (exclusive of officers)	127
Captain of main-top	1		

The complement as given above, exclusive of the sub-lieutenants and boys, is at all times borne.

The number of boys and the length of their stay is determined by the number whose year of training will be completed during the summer. The usual duration of a stay on board is two months, though it is sometimes shortened to six weeks.

In the first fortnight of the cruise the brigs come into port again every evening. At the end of this fortnight they proceed to sea, returning to harbor every Friday afternoon, to remain until the succeeding Monday morning.

Seamanship is, of course, made of primary importance, but much attention is also given to gun practice, frequent firing at target taking place.

An elaborate report of exercises is handed in weekly to the commanding officer of the parent ship, noting every evolution with its details. Each evolution, before being begun, is carefully explained to the boys; after the explanation they are mustered at their stations and the evolution is *slowly* performed. Everything is done with a view to impressing the details upon their minds.

While under way, during the day, the exercise is constant, and once every watch the crew is exercised for man overboard. Every Friday, on coming into port, if the anchorage is a secure one, the sails are unbent and the boats are hoisted out. Boys are always at the helm at sea, but no one for more than an hour at a time. Every opportunity is taken, both in port and at sea, to exercise the boys in swimming.

The drill of these two months, being most constant and severe, has a very telling effect upon the boy's knowledge of practical seamanship. If he has passed through all the instructions, he has become already acquainted with much of the detail of a vessel's equipment; he has had much practical knowledge of handling sails and spars on board the parent ship, and leaves her with an excellent stock of sea-faring knowledge and an education which has fitted him to put his knowledge into practice.

Each brig is under the immediate control of the commander of the ship to which she is attached, and is frequently inspected by him. They are all usually assembled at some time during the summer, and take a short cruise in company. At this time there is always a regatta held, at which a prize is competed for.

This practice in the brigs, and the gunnery course on board the gunnery-ships complete the training, which extends altogether over a period of about sixteen months, twelve of which are in the training-ship proper. Any time after the expiration of the year of entry, the boys are subject to draft, but the four months of practical exercises are too important to be omitted excepting for unusual exigencies, which rarely occur.

CHAPTER VI.

MESSING AND DIET.

The messes have usually twenty in each. Two boys are selected as the captains of the mess, and are responsible for its order and discipline. There are also two cooks selected weekly, on whom the work of the mess falls. The cooks take the food from the coppers, but it is divided by the captains of messes, under the superintendence of the officers of the mess-decks. At dinner, the mess-tables, before the boys are marched down, are inspected by a lieutenant. The boys are formed upon the upper deck, and go below by bugle call; they remain standing at the mess-table until the senior captain of the mess says grace, after which they are seated by bugle. The hours for meals are as follows:

In summer:	
Breakfast	6.30
Dinner	12.00
Tea	5.00
Supper	7.30
In winter:	
Breakfast is at	7.00
Tea	4.30

The other hours being the same.

The tables are those of the regulation pattern in the British service. They are kept bright, and whenever I saw them, which was frequently, were scrupulously neat and clean. Knives, forks, spoons, and crockery are supplied by the government. The crockery is of a good and serviceable quality; no tin is used, as in our service, except for the larger utensils. The general equipment of the sailors' mess in the English service I consider in advance of our own. They are allowed many little conveniences which our own men have not, and an English ship always presents on the mess-deck a home-like and comfortable air, which must go far towards making contented men. Tables are allowed them at nearly all times, affording places for reading, sewing, or writing. There is not so much effort to get things out of sight as with ourselves; an effort which may be productive of neatness, but which is made very often at the sacrifice of a good deal of comfort and pleasure on the part of the crew.

The following dietary has been adopted. It is extremely good and wholesome, and much better than that furnished in sea-going men-of-war of the British service:

BREAKFAST.

4 oz. corned beef; 12 oz. soft bread; ¾ oz. chocolate; ¾ oz. sugar.

DINNER.

First day.—12 oz. fresh beef, roasted; 12 oz. potatoes.

Second day.—12 oz. fresh mutton, roasted or baked.

Third day, or sea-pie day.—12 oz. fresh beef; 12 oz. potatoes; 4 oz. flour; ½ oz. fresh suet; 8 oz. mixed vegetables.

Fourth day.—12 oz. corned pork; 12 oz. potatoes; 4 oz. split peas.

TEA.

8 oz. soft bread; ⅛ oz. tea; 1 oz. sugar.

SUPPER.

4 oz. soft bread; 2 oz. molasses.

The quantities of meat here shown are exclusive of large bones. The details of the ration are shown in the following table:

Day.	Soft bread.	Sugar.	Chocolate.	Tea.	Fresh beef.	Fresh mutton.	Corned pork.	Mixed vegetables.	Potatoes.	Split peas.
	Lbs.	*Oz.*	*Oz.*	*Oz.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*
Sunday	1½	1¾	¾	⅛	.....	¾	¼	.....	¼	.....
Monday	1½	1¼	¾	⅛	¾	.....	¼	.....	¼	.....
Tuesday	1½	1¼	¾	⅛	¾	.....	¼	½	¼	.....
Wednesday	1½	1¼	¾	⅛	.....	.....	1	.....	¼	¼
Thursday	1½	1¼	¾	⅛	.....	¾	¼	.....	¼	.....
Friday	1½	1¼	¾	⅛	¾	.....	¼	.....	¼	.....
Saturday	1½	1¼	¾	⅛	¾	.....	¼	½	¼	.....

Day.	Carroway seed.	Flour.	Suet.	Raisins.	Mustard.	Pepper.	Vinegar.	Salt.	Molasses.
	Oz.	*Lbs.*	*Oz.*	*Oz.*					
Sunday	.....	½	1	2	.....	.....	.....	.....	2
Monday	.....	.....	.....	.....	.....	.....	.....	.....	2
Tuesday	.....	¼	½	.....	.....	.....	.....	.....	2
Wednesday	$\frac{1}{128}$	.....	.....	.....	.....	.....	.....	.....	2
Thursday	.....	½	1	2	.....	.....	.....	.....	2
Friday	.....	.....	.....	.....	.....	.....	.....	.....	2
Saturday	.....	¼	½	.....	.....	.....	.....	1¾	2

One-half ounce of mustard, ¼ ounce of pepper, and ½ gill of vinegar are served out every eight days.

This dietary I have heard somewhat criticised, as being such that boys become very dissatisfied with the food they get in active service, after transfer from the training ships. But most arguments seem to be upon the side of giving the boy as much food as he can with benefit to himself take. His constitution is forming and the effect of the very limited supply of food which many of them have had to endure must be overcome. The effort is to send out a good physique as well as a well-trained mind. Sea rations have by no means kept pace with the improvements effected in the preservation of food; in these days of preserved stores, additions might well be made which would save to the men the sums they are pretty sure to expend in provisions out of their own pockets. In the opinion of many, it would be better, instead of

complaining of the liberal diet of the boys, to take away the complaint on the part of the men in sea-going ships by assimilating their own diet as far as possible to the foregoing schedule.

I would call attention too to the four meals a day which these boys are allowed, their last meal being at 7 or 7.30 in the evening. In many ships at sea the men get nothing after four o'clock in the afternoon. They may be as much, or more, on their feet during the night as during the day; the men of the mid-watch get nothing until at breakfast at 7.30 the next morning; the men of the morning-watch, of late years, have morning coffee. Treatment such as this is too much to ask of nature.

The result of the treatment in the training ships has been to make an excellent physique. A clear, healthy complexion, good carriage, and fine height and figure are very general. I subjoin the averages of height, weight and chest-measurement of the boys of the Impregnable, as taken for publication in the official Blue Book.

	Height.	Weight.	Chest measurement.
	Feet. Inches.	*Pounds.*	*Inches.*
At entry	5 3.92	117.08	32.29
After one year	5 5.67	132.58	34.29

Showing an average gain in height of 1.75 inches; in chest measurement 2 inches; in weight, 15.5 pounds.

CHAPTER VII.

DISCIPLINE AND PUNISHMENT.

A special scale of punishment is laid down for the boys of the training ships. Those generally given are the following:

First. To have their meals at the defaulters' mess-table on the main deck and to stand between the guns during the hours of recreation.

Second. Boys of careless and inattentive habits with reference to clothes, hammocks, or bags, are made to carry their hammocks or bags on their shoulders for a time not to exceed an hour a day—and this to be limited to three days.

Third. Stoppage of liberty not to exceed two months.

Fourth. Stoppage of pocket money not to exceed two months.

Fifth. Caning over the breech not to exceed twelve blows.

Sixth. Confinement not to exceed seven days. In aggravated cases the delinquent may be put on bread and water for from one to three days.

Seventh. Birching (by special order). Light punishments have generally been found sufficient; the cases are very few, the conduct in general being remarkably good.

LIBERTY AND LEAVE.

General liberty is granted on Thursdays from one o'clock until sunset. In winter, when sunset occurs at a very early hour, this time is extended. Boys, whose parents reside in or near the port in which the ship is lying, are permitted to go ashore on Sunday afternoons. Other boys are allowed to go at the same time for a walk or ramble ashore, accompanied by some of the instructors or ship's corporals. A playground is rented near the ship where the boys can go on liberty days for outdoor games.

A certain number of holidays are given through the year, as follows:

Sixteen days from the second Thursday before Easter.

Sixteen days from the Thursday nearest September 1.

Twenty-one days from the Thursday nearest December 15, making a total of fifty-three days yearly.

Boys are required to go home at their own expense, except that a shilling a day may be allowed for maintenance *en route*. The railway companies carry them at a very low fare, and when the time for leaving arrives an agent is sent on board to provide the tickets, so that the boy starts from the ship untrammeled. If a large number go in one direction a special train is frequently provided. Boys who do not go home are excused school during the holidays.

Immediately on his return from leave, each boy has a bath, has his hair cut, and is medically examined.

I have had the opportunity of observing the conduct of these boys when ashore on liberty in large numbers, and I have never seen them otherwise than orderly and neat. Their conduct, judged from close observation at many different times, was most excellent. My chief opportunities were at Devonport and Plymouth, towns lying adjacent, with a combined population of 150,000, and where every temptation to young men or boys is offered.

A certain number of ship's corporals are sent ashore at the times when the boys are on liberty, with instructions to arrest any one and send him off to the ship, whose conduct is reprehensible to a great degree. A report of minor delinquencies is sent in the next morning by each corporal. I noticed amongst these such reports as "swaggering," "wearing hat improperly," &c., but saw no reports of a serious nature, though the watch kept is evidently a strict one. The reports of the corporals are not confined to boys of their own ship.

I may here remark that I saw but one drunken sailor at this port (Plymouth and Devonport) during a stay of nearly two weeks, though many ships were in the harbor, and a great many men ashore. This change of conduct for the better is attributed by every one to the influence of the training service; I have conversed with many officers on the subject and found this opinion general. Ten or twelve years since the men of the English fleet were accustomed almost as much as our own to get drunk when ashore. We have almost come to consider it the normal condition of a blue-jacket when on *terra-firma*. That a change can be effected is shown by that which has taken place amongst the sailors of a race, the lower orders of which are notedly given to drink.

I find Captain Fitzroy, so long as four years since, in some remarks before the Royal United Service Institution (July, 1875), in discussing the discipline of the fleet, saying: "For six weeks in the spring of last year I was at Plymouth, and during the whole of that time I only saw one blue-jacket badly dressed or drunk in the streets. * * * I mention it to show how much better their conduct is on shore now than it was some years ago. I attribute it mainly to the admirable system of training," &c.

The opinions of other officers in the same discussion were equally emphatic.

BADGES.

Good-conduct badges are given those recommended for general good conduct and efficiency both at drill and study.

To obtain a badge a boy must know all the running and standing rigging; have a fair knowledge of the compass and lead line; be able to make all the bends and bitches laid down in the instruction tables; be able to pass an earing; and be able to answer well in a *viva voce* examination. He must be fairly advanced in great-gun, infantry, and cutlass drills. He must be able to read and write well; to write fairly from dictation; know arithmetic as far as compound division; have a fair knowledge of the outlines of geography, and must have made fair progress in religious knowledge.

The wearers of these badges are generally selected at the quarterly examinations; they are exempt from punishment except by special order; enjoy all the privileges of a boy petty officer, and are not employed as sweepers or bag-stowers. A boy is awarded the badge or deprived of it by the captain in person.

The badges are furnished gratuitously; they are the same in shape as those worn by the men, but are somewhat smaller, and are similar in shape to a sergeant's chevrons. They are of gold for the mustering suits; red-worsted for their every-day suits; and blue for the duck suits. Petty officer boys wear in addition a small crown of gold and crimson. No boy is allowed more than three badges.

RECREATIONS AND AMUSEMENTS.

After study hours, the school-room is thrown open to the boys. They have here all conveniences for reading, writing, and playing games. Chessmen, checkers, dominoes, puzzles, &c., are provided in great plenty for them, and I noticed very many at such games. The school-room is well lighted in the evening, as are also the main and middle decks.

There is an excellent library of 800 volumes (some of the ships have many more). Periodicals of all kinds are supplied, especially such as are suited to boyish tastes. A magic-lantern is also furnished each ship, in connection with which lectures are given twice a week in winter under the superintendence of the chaplain. A vaulting-horse, parallel bars, and a horizontal bar, and thirteen sets of dumb-bells are furnished as part of each ship's equipment. The horse and bars are kept on the quarter-deck, and are always placed for use out of study hours. On Thursday afternoons and on all holidays, the full apparatus is set out. Boys in entering are passed through a course of twelve lessons in gymnastics before being put to gunnery drill. A non-commissioned officer of marines is detailed as an instructor in each training ship.

In connection with the subject of amusements, &c., what is called the capitation allowance may be spoken of, as it is the fund from which all the above is supplied, in addition to meeting many other expenses.

The allowance is 12 shillings or $3 per annum for each boy. The regulations defining its expenditure state the following items as the principal ones for which it may be used:

1st. Mess gear not ordinarily supplied.

2d. Extra fittings for school-room, bath and model rooms.

3d. Materials for keeping mess-traps clean, blacking and shoe-brushes for each mess.

4th. Thread for tailors, and materials for repairs for shoemakers, shoe-strings, braid for watch-marks.

5th. Music.

6th. Two to six cents a week for prizes for petty officer and badge boys.

7th. Allowance of 1 shilling per diem to each boy requiring it, as subsistence money on his way to and from home, when on leave.

8th. Bats, balls, and other requisites for games and amusements.

9th. Expenses for excursions. (An annual excursion by steamer is given the boys to some pleasant place adjacent to their port.)

10th. Extra expenses for Christmas dinners.

The accounts of this fund are kept separately; the expenditure is under the direct control of the captain, and he has much latitude regarding its disposition. Boys are allowed 6 cents weekly as pocket-money, which is given them before going ashore on Thursdays.

I think the preceding will show to what civilizing influences the boys are subjected. They are well fed, well clothed, and well treated, and taught to be excessively neat in clothing and in person. They meet with no harshness, their treatment throughout being thoroughly humanizing and kind. Many of them of course are greatly elevated in the scale of well-being by entering the service; but great numbers likewise come from families in good circumstances of life. These are not degraded, as was formerly too much the case, by life on board a man-of-war. The life is made as pleasant and comfortable and respectable as life on board ship can be. There must always be certain drawbacks; ships cannot always afford the space sufficient for proper comfort and cleanliness; but what can be done in the English service has been done. The sailor has been made a man of high respectability, instead of the drunken, careless fellow of some years since. The men who man her ships are a body of whom England is justly proud. There is no town in England so distant from the sea but that the man-of-war's man is often seen, and always in uniform, which he wears as if he respected it. The army is on a very different footing. An enlistment in this is regarded as the last resource of the ne'er-do-well. The people of the country village regard the name of soldier as much synonymous with the word vagabond. While of late years the character of the soldier has been falling off, the character of the sailor has been steadily improving. So much has the former been the case, that it is felt that something must be done to induce the enlistment of more respectable men in the army, and the adoption of a training system similar to that of the navy is much discussed.

The basis of my remarks on the subject of the army are the late parliamentary debates on the army bill of the present session, so that I do not make them unadvisedly.

So much, on the other hand, has the sailor grown in popular estimation, that double the number of lads offer themselves that can be accepted. Every boy who goes on leave, on his return is followed by a number of applications from his district to the authorities of the ship.

Whether for peace or war, men so trained and disciplined are valuable to any country. They are, on the average, even if they serve but one enlistment, twelve years under discipline; they are obliged to serve until twenty-eight years of age at least. A great many do not serve beyond this, but it is a mistake to suppose that they are lost to the country, or

that their training goes for naught: the country at large will benefit by it; society gets a young man in the prime of life; sober, disciplined in mind and body; a valuable man to any community, whether civil or military.

We in the United States expend vast sums in educating the children of the nation; we recognize education as one of the necessities of our national existence: why cannot the same principle apply with even greater force to those who are selected to uphold the national honor and interests, and who may be *emphatically* termed the children of the nation? Money so expended is well spent, and though the cost to England is something over $500,000 a year for these boys, the result is well worth it. The principle has been recognized in the unequaled training of officers given by our government, to those both of the Army and Navy, and every officer hopes in our system of training lately established, a result which will give us a class of men worthy of a nation which has made the education of its people its boast. The command of an educated and thinking class of men is a benefit, too, to the officer; affording him a stimulus, and releasing him from the necessity of directing too much of his energy and time towards the mere disciplining of those under him, collected, as they have been too much with us, from every nation, and addicted to every vice to which the waifs of humanity are subject. The last ship in which I served had, in a crew of 301 men, the representatives of seventeen different nationalities. Is it not time that a country of fifty millions of people should be able to find among its own citizens enough to man the few ships we keep afloat, instead of calling upon Finland and the Sandwich Islands (both of which countries were represented in the crew I speak of) for its defenders? We protect almost every species of labor but that which goes towards the working of our guns and the handling of our ships.

COST OF TRAINING.

The average cost per boy for one year by returns of August, 1878, was £45 15*s.* 8*d.*, or about $225. This cost, however, included an expenditure for the whole force of £32,212, which was incurred by the following:

Wages and food of that portion of the crews which would be discharged to shore if the ship were paid off. Difference between full and half pay of certain officers; special allowances, &c	£17,505
Repairs of ships, tenders, coal, &c	14,707
Total	32,212
The total expenditure of last year was	£113,590
Deducting above amount	32,212
There is a total on account of the boys of	81,378

Giving an average expenditure for each of about £33, or about $160 for twelve months. This includes the following—

Clothing and bedding gratuity	£6	0*s.*	0*d.*
Wages for one year as second class boy	9	2	6
Food for one year	18	6	9

This is a great deal less than the cost per boy on board the Warspite (the oldest established of the mercantile training-ships in England). There the cost of each boy *sent afloat* is over £60. The Exmouth makes no better showing when the number of boys sent out is considered, nor does any one of the many others stationed about the British coasts. The total cost of the Greenwich Hospital School per boy (*vide post*) is about £20 a year, but the circumstances are quite different. The boy may be kept as long as four and a half years, thus making his total cost much greater.

Nor even if the cost of the training-ships of the mercantile marine were much less, would it be advisable to take many from them into the Navy, instead of training the full complement in naval vessels. By arrangement with a certain number of these ships, boys who can pass the naval standards, after receiving the mercantile training, can be received into the naval training-ships as second-class boys; but not more than forty a year pass. And in the language of Admiral Nicolson, R. N., "The boys are no more trained as compared with our boys, than a mere militiamen with a guardsman."

CHAPTER VIII.

ROUTINES.

In the following, the word "instructor" refers to the petty-officer instructor, whose status has been before described. Only the essential parts of the routines are given.

SUMMER.

MONDAY.

A. M.

5.00.—Turn hands up.

5.10.—Instructors inspect and stow hammocks.

5.20.—Watch clean upper and main decks.

Watch below wash and bathe.

6.05.—Watch below to quarters, to clean guns.

6.30.—Breakfast.

7.00.—Watch stow bags.

Watch below clear up mess-decks.

7.15.—Watch to muster; to be exercised at stations by the instructors and boatswain's mates.

7.40.—Assembly; cross upper yards and exercise at station.

8.00.—Watch below to quarters; watch on deck square yards.

8.30.—Assembly. Boys fall in for inspection, towels in hand.

Inspection is made by instructors, ships' corporals, barbers, and tailors. After inspection towels are hung on the lines to dry. (NOTE. I would mention here that the lines on which towels are hung are left up until the towels are dry. They remained up even at an inspection by the port admiral which I witnessed).

9.00.—Divisions and prayers.

9.15.—General sail drill.

10.15.—Stand easy ten minutes, afterward continue sail drill, other watch aloft.

11.30.—Down top-gallant and royal yards, clear up decks, reeve clothes lines. Cooks and captains of messes prepare dinner tables. Messes, when ready, are inspected by a lieutenant.

Dinner.

P. M.

12.45.—Stand by towels.

Assembly. Boys fall in on quarter deck. Offenders are punished in the presence of all the boys. Boys told off as per routine.

2.25.—Stand easy five minutes. Boys of first instruction go over mast-head.

2.30.—Change drills.

3.30.—Retreat. Up bags; shift into night clothing; wash clothes.

5.00.—Tea.

5.30.—Fire stations; afterwards one watch of boys to go in boats to practice pulling. The other watch to bathe.

7.30.—Up boats.

Supper, prayers, and hammocks.

8.30.—Captains of messes report to instructors that messes have been cleared up.

8.45.—Pipe down.

9.00.—Rounds.

TUESDAY.

(The differences only from the routine of Monday are noted in the following :)

7.40.—Assembly ; cross-yards; make and shorten sail with square yards.
9.00.—Prayers ; boys told off for instruction and drill.
10.00.—Stand easy five minutes; boys of first instruction go over mast-heads.
10.05.—Change drills.
11.30.—Retreat; assembly; down upper yards.

P. M.
3.45.—Down top-gallant masts; lower boats for pulling exercise.
5.30.—Divisions; inspect night clothing; remainder same as on Monday.

WEDNESDAY.

7.40 A. M.—Up top-gallant masts; cross-yards; make sail; brace for casting; hoist jib; brace round; shorten and furl.
Remainder of morning as on Tuesday.
P. M.—Boys not at school at general boat exercise; sailing and rowing.
3.30.—Down top-gallant masts.
Remainder of routine as on Monday.

THURSDAY.

Morning routine as on Wednesday.
In afternoon, general liberty.

FRIDAY.

Morning routine as on Wednesday.
In afternoon boys not at school to be landed as a battalion.

SATURDAY.

General cleaning in the morning.
At 7.30, target-firing party to be sent to the Circe for practice.
11.15.—Air bedding; the blankets (which are all fitted with permanent stops) are stopped onto the lines separately; the habit of passing the lashing around the hammock and bedding and tricing it up into the rigging is not permitted.
In the afternoon the boys are sent to the bath-rooms to bathe.
Clean hammocks to be served out on alternate Saturdays; clothes lines are rove on Mondays, Wednesdays, and Fridays at 11.35 a. m.; clothing is always washed after 5.30 in summer; mattress covers are washed once a month.

The winter routine only differs from that in summer in such things as must be changed on account of weather and exposure. Clothes are washed but twice a week, and hammocks every three weeks. No washing of decks takes place in very cold weather. No sail drills take place during the winter months.

The following are the regulations regarding the manner of conducting the morning inspection :

The boys are to muster towels in hand; as soon as the towels have been inspected they are to be hung on the lines; when the boys reassemble the following inspection is made :

1. The sleeves are to be turned up and the cleanliness of the person is to be minutely ascertained.
2. "Right about face." Examine clothing critically.
3. "Right half face." Each boy is to hold up first his right arm; then left, to see that the frock is in good repair.

4. "Front." Off shoes and stockings; roll the trousers above the knees; examine legs and feet.

5. "Right about face." Examine heels, heads, and legs.

6. "Front." Off caps; inspectors and police see hair properly cut; examine caps.

Tailors, shoemakers, and barbers are always to attend at this inspection. The tailors carry with them a preparation for removing spots, which is applied during this inspection.

A portion of the boys are detailed every Monday morning for work under the tailors, in order to learn how to make and mend their clothing; a large part of the tailors' duties consist in giving this instruction.

Upper school routine.

SUMMER.

	A. M.				P. M.			
DAY.	9.15 to 9.45.	9.45 to 10.	10 to 10.45.	10.45 to 11.30.	1 to 1.50.	1.50 to 2.30.	2.30 to 2.45.	2.45 to 3.30.
Monday.	Sail drill.				Reading.	Writing.	Geography.	Arithmetic.
Tuesday.	Scripture.	Geography.	Writing.	Arithmetic.	Reading.	Writing.	Geography.	Arithmetic.
Wednesday.	Scripture.	Geography.	Writing.	Arithmetic.	Scripture-reading.	Writing.	Geography.	Arithmetic.
Thursday.	Scripture-reading.	Geography.	Writing.	Arithmetic.	Boys ashore on leave.			
Friday.	Scripture-reading.	Geography.	Writing.	Arithmetic.	Scriptnre-reading.	Writing.	Geography.	Arithmetic.

Lower school routine.

SUMMER.

		A. M.				P. M.		
DAY.	DIVISIONS.	9.15 to 9.45.	9.45 to 10.20.	10.20 to 10.50.	10.50 to 11.30.	1 to 1.55.	1.55 to 2.40.	2.40 to 3.30.
Monday.	1, 4, 2, 5, 3, 6.	Sail drill.				Reading. Writing. Arithmetic.	Writing. Arithmetic. Reading.	Arithmetic. Reading. Writing.
Tuesday.	1, 4, 2, 5, 3, 6.	Scripture. Scripture. Scripture.	Reading. Writing. Arithmetic.	Writing. Arithmetic. Reading.	Arithmetic. Reading. Writing.	Reading. Writing. Arithmetic.	**Writing.** Arithmetic. Reading.	Arithmetic. Reading. Writing.
Wednesday.	1, 4, 2, 5, 3, 6.	Scripture. Scripture. Scripture.	**Reading.** **Writing.** **Arithmetic.**	Writing. Arithmetic. Reading.	Arithmetic. Reading. Writing.	Reading. Writing. Arithmetic.	Writing. Arithmetic. Reading.	Arithmetic. Reading. Writing.
Thursday.	1, 4, 2, 5, 3, 6.	Scripture. Scripture. Scripture.	Reading. Writing. Arithmetic.	Writing. Arithmetic. Reading.	Arithmetic. Reading. Writing.	Boys on shore.		
Friday.	1, 4, 2, 5, 3, 6.	**Scripture.** **Scripture.** **Scripture.**	**Reading.** **Writing.** **Arithmetic.**	**Writing.** **Arithmetic.** **Reading.**	**Arithmetic.** **Reading.** **Writing.**	Reading. Writing. **Arithmetic.**	Writing. Arithmetic. **Reading.**	Arithmetic. Reading. Writing.

Upper school routine.

WINTER.

	A. M.				P. M.			
DAY.	9.25 to 9.55.	9.55 to 10.10.	10.10 to 10.50.	10.50 to 11.30.	1 to 1.35.	1.35 to 2.5.	2.5 to 2.20.	2.20 to 3.
Monday.	Reading.	Geography.	Writing.	Arithmetic.	Reading.	Writing..	Geography.	Arithmetic.
Tuesday.	Scripture.	Geography.	Writing.	Arithmetic.	Reading.	Writing.	Geography.	Arithmetic.
Wednesday.	Scripture.	Geography.	Writing.	Arithmetic.	Reading.	Writing.	Geography.	Arithmetic.
Thnrsday.	Scripture.	Geography.	Writing.	Arithmetic.	Boys ashore on leave.			
Friday.	Scripture.	Geography.	Writing.	Arithmetic.	Reading.	Writing.	Geography.	Arithmetic.

Lower school routine.

WINTER.

		A. M.				P. M.		
DAY.	DIVISIONS.	9.25 to 9.55.	9.55 to 10.30.	10.30 to 11.	11 to 11.30.	1 to 1.40.	1.40 to 2.20.	2.20 to 3.
Monday.	1, 4, 2, 5, 3, 6.	No scripture lesson. The other lessons (as below) to last 40 minutes.				Reading. Writing. Arithmetic.	Writing. Arithmetic. Reading.	Arithmetic. Reading. Writing.
Tuesday.	1, 4, 2, 5, 3, 6.	Scripture. Scripture. Scripture.	Reading. Writing. Arithmetic.	Writing. Arithmetic. Reading.	Arithmetic. Reading. Writing.	Reading. Writing. Arithmetic.	Writing. Arithmetic. Reading.	Arithmetic. Reading. Writing.
Wednesday.	1, 4, 2, 5, 3, 6.	Scripture. Scripture. Scripture.	**Reading.** **Writing.** **Arithmetic.**	Writing. Arithmetic. Reading.	Arithmetic. Reading. Writing.	Reading. Writing. Arithmetic.	**Writing.** Arithmetic. Reading.	Arithmetic. Reading. Writing.
Thursday.	1, 4, 2, 5, 3, 6.	Scripture. Scripture. Scripture.	Reading. Writing. Arithmetic.	**Writing.** **Arithmetic.** **Reading.**	Arithmetic. Reading. Writing.	Boys ashore on leave.		
Friday.	1, 4, 2, 5, 3, 6.	**Scripture.** **Scripture.** **Scripture.**	Reading. Writing. Arithmetic.	**Writing.** **Arithmetic.** **Reading.**	Arithmetic. Reading. Writing.	Reading. Writing. Arithmetic.	Writing. Arithmetic. Reading.	Arithmetic. Reading. Writing.

HER MAJESTY'S SHIP IMPREGNABLE.

Weekly gunnery instruction report, ———, 187—.

Instruction.	Section.	Subject.	No. of days allowed in section.	No. of boys in section.	No. passed out during the week.	No. in section over days allowed.	Instructors.
First ...	1st..	Gymnastics					
	2d ..	Facings, saluting, and putting on belts					
	3d ..	Squad drill without arms, but with belts on .					
Second ..	1st..	Manual exercise.....					
	2d ..	Squad drill with arms.....					
	3d ..	Firing exercise and company drill.....					
Third....	.....	Cutlass drill, cuts, points, and guards, review exercise					
Fourth ..	1st..	Handspike drill, parts of gun, &c., casting loose, &c., manning both sides, sponging, loading, and securing.....					
	2d ..	Pointing, shifting trucks, and the different firings in slow time, using words of command.....					
	3d ..	General truck-gun drill in quick time, and using signals					
Extra....	.....	Pistol exercise					
		Cutlass drill, stick practice.....					
		Swimming					
		Bugle					

Number of hours during the week at instructions.....
Number of hours during the week at general quarters.....
Number of hours during the week at battalion drill .....
Number of shots during the week.. { 6-pounder ..... / rifle ..... / pistol..... }
Life-buoys examined and fit for use.....

——— ———, *Gunner.*

——— ———, *Lieutenant.*

HER MAJESTY'S SHIP IMPREGNABLE.

Weekly seamanship report, ——, 187—.

Instruction.	Section.	Subject.	No. in section.	No. passed out during the week.	No. over one month in section.	Instructors.
First	1st..	Laying out kits, slinging and stopping on hammocks, lashing up hammocks, parts of the ship ..				
	2d ..	Names of masts, yards, and sails, and standing rigging, monkey topsail				
	3d ..	Pulling, parts of boat, &c				
Second ..	1st..	Bends and hitches				
	2d ..	Compass				
	3d ..	Lead and line, heaving the lead				
Third....	1st..	Knotting and splicing worm, parcel and serve seizings and whippings, description of blocks, ropes, &c				
	2d ..	Compass and steering, sea terms, rule of road				
	3d ..	Reeving running gear, shifting sails				
Fourth ..	1st..	Mat and sennit making, fitting rigging				
	2d ..	Anchors and cables				
	3d ..	Use of purchases, setting up rigging, fitting out, and stripping ship				
		Sailing launch				
		Sailmaking				
Extra....	.....	Signals				
		Colomb's lights				
		Piping				
		Tailoring				

Number of hours during the week at classes.....
Number of hours during the week at sail drill.....
Number of times boats away for general exercise.....

—— ——, *Boatswain.*

—— ——, *Lieutenant.*

PART II.

GREENWICH HOSPITAL SCHOOL.

PART II.

CHAPTER I.

One of the most interesting schools in England is the Greenwich Hospital School, which dates its origin from the time of William and Mary, by whom it was founded as a receptacle for the children of seamen who had fallen or been wounded in the wars of that period. It did not get into practical operation until 1712, between which time and 1870 it passed through many changes, being for more than a century almost completely diverted from its original purposes, and becoming, to a large extent, a training school for the sons of officers who were to enter the Navy as midshipmen. It was not until 1870 that a thorough reorganization took place and the school took on its present character. When this was done Captain Burney, the author of the well-known Seamanship Manual, was appointed to the superintendency. He is, besides the paymaster and chaplain, the only commissioned officer connected with the school, the assistants being wholly taken from the subordinate ranks of the service, or, as in the case of the masters, from civil life.

The school buildings consist of a large central edifice, occupied chiefly as quarters by the superintendent (but in which there are, also, a small museum, a library for pupil-teachers and masters, and some offices), and of thirteen other large buildings, of which the chief are the dormitories, the mess-hall, gymnasium, chapel, hospital, and swimming bath. They stand in grounds covering 18 acres, and are separated from Greenwich College (late Greenwich Hospital) only by a street, so that to the casual observer they seem to form part of the same establishment. The greater number of the buildings were erected in 1805, some few, long before, and several of the most important within a few years only. The whole is on the most complete scale, and, so far as I can judge, there is nothing wanting. In the central part of the grounds there is built a complete vessel from the water-line up, fully equipped as to spars and all interior fittings. This is used for instruction in seamanship. She represents a vessel of about 1,200 tons displacement.

The school is on what is termed the half-time system, in which the day is divided between study and manual labor. This system is now receiving very extensive application in England, especially to what is termed "industrial schools" (a class of schools similar to our reformatory schools), and of which Feltham (to be hereafter mentioned) is a striking example. Half the day is given to study, the other half to work at a trade to which the boy has been assigned. The success of this plan, wherever tried in England, has been very great. The boy

enters life, if from one of the civil establishments, with a definite object, and with hands and mind both trained. It is the old apprentice system pursued upon a gigantic scale, with the addition of a sound English education, which the apprentice of former times did not get, nor which he of to-day gets unless he has the energy to attend a night-school.

The present regulations for admission to Greenwich School are of date November 30, 1878. Those of previous date allowed a boy to choose whether he should go to sea in the Navy or not. It was found, however, that very few entered the service, so that the government was in no wise directly benefited. Service in the Navy is now, however, obligatory if the boy reaches the naval standard; if not, he is apprenticed in the merchant service.

REGULATIONS FOR THE ADMISSION OF BOYS TO GREENWICH HOSPITAL SCHOOL.

I. The school will consist of one thousand boys, the sons of petty officers and seamen, and of non-commissioned officers and privates of marines, who have served or are now serving in the Royal Navy or Coastguard, and of other seafaring persons.

II. All claims for admission to the school will be judged by a committee of selection appointed by the Lords Commissioners of the Admiralty, in the following order of precedence, special consideration being given to length of service at sea:

(1.) Orphans; both parents dead.

(2.) Sons of fathers killed, drowned, deceased, wounded, or seriously maimed in Her Majesty's service, or while employed by Her Majesty on board a merchant ship or in action with an enemy, pirate, or rebel.

(3.) Those whose fathers, having served in the Royal Navy or Marines, are dead.

(4.) Those whose fathers are serving and whose mothers are dead.

(5.) Sons of naval and marine pensioners. Sons of seamen and marines now serving; both parents living.

(6.) Sons of seamen or marines entitled to the benefits of Greenwich Hospital not included in the foregoing classes. Also the sons of those in the Naval Reserve.

(7.) Sons of other seafaring persons.

The sons of commissioned and other officers are not absolutely excluded, provided that the peculiar circumstances of their case render them eligible for this charity.

III. Applications for admission are to be made to the secretary of the Admiralty (Greenwich Hospital branch), London, when the necessary forms will be sent, which, when properly filled up, must be returned as directed, with the following documents:

(*a.*) Certificate of marriage of the parents, or, if not obtainable, satisfactory proof thereof.

(*b.*) A certificate of registry of the boy's birth.

(*c.*) A certificate from the clergyman of the parish to which the boy belongs, or from the minister of his denomination, or from the master of the school at which the boy has been educated, as to his character and moral conduct.

(*d.*) An agreement, signed by the boy and his parents or guardians, that he shall serve in the Royal Navy for a period of ten years' continuous and general service, from the age of eighteen, in addition to whatever period may be necessary, until he shall have attained that age, if found physically fit and up to the prescribed standard on his discharge from the school; otherwise, that he shall be bound apprentice in the merchant service for four years and enrolled in the Royal Naval Reserve.

IV. The services of the father, upon which the claim is founded, will be ascertained at the Admiralty, and due notice will be given, without further application, should the boy be selected for admission into the school.

V. Boys are eligible for admission between ten and a half and thirteen years of age. They must be physically fit for sea service according to the prescribed standard; must be able to read an easy sentence; and must have a knowledge of the four simple rules of arithmetic.

The prescribed standard is as follows:

Age.	Height without shoes.		Measurement round chest.	Weight.
	Feet.	*Inches.*	*Inches.*	*Pounds.*
Ten and a half and under eleven	4	3½	24	59
Eleven and under eleven and a half	4	4	24½	61
Eleven and a half and under twelve	4	4½	24½	63
Twelve and under twelve and a half	4	5	24¾	66
Twelve and a half and under thirteen	4	5¾	25	69
At thirteen	4	7	25½	72

VI. Applications will not be received until the candidates are ten and a half years of age.

VII. After admission to the school, boys will be examined monthly by the medical officer, and especially at thirteen years of age, as to their physical condition, and if at any time found to be unfit for further retention in the school they will be discharged at once; otherwise they will be kept in the school until they reach the age of fifteen and a half years, when they will be entered for continuous service in the Royal Navy if found physically fit, and up to the prescribed standard. If found unfit for entry into the Royal Navy, they will be bound apprentices in the merchant service for four years, and enrolled in the Royal Naval Reserve.

VIII. Vacancies occasioned by discharge of boys found physically unfit at thirteen years of age will, as far as possible, be filled by selection from the sons of seamen and marines, who must be thirteen years of age, fit and willing for service in the Royal Navy, and able to pass a sufficient examination in reading, writing, and arithmetic.

IX. Applications for the admission of boys at thirteen years of age must be made one month previously, in the same manner as directed in clause III.

X. The nautical division is not to exceed one hundred and twenty boys, who will be selected from the general school, by competitive examination as a rule, at thirteen years of age. They will be educated to fill the positions of pupil teachers, writers, and ship's steward's boys in the Royal Navy. No boy will be eligible to be transferred to this division of the school after fourteen and a half years of age. Boys failing to come up to the prescribed standard at fourteen and a half years of age will be bound apprentices in the merchant service.

XI. The education of the boys in the general division will comprise the usual elements of a sound English education, alternating with practical seamanship and other industrial occupation designed to prepare them for a seafaring life.

XII. In the nautical division, elementary mathematics, and mechanics, nautical astronomy, and French will be taught.

XIII. A thorough knowledge of the art of swimming being one of the requirements for entry into the Royal Navy, all boys in the school will be taught to swim, and will be periodically examined as to their proficiency.

XIV. Children of Roman Catholics, or of Protestants not members of the Church of England, will not be required to learn the church catechism, and will be allowed to attend convenient places of public worship in accordance with the religious persuasions of their fathers, provided that application be made to that effect by the father, if living; if he be dead at the time of the boy's admission, then the marriage certificate of the parents, or baptismal register of such child, according to the usage of any established religious community, of a date previous to the father's death, will be received as evidence of the religious tenets of the father.

The money appropriated to the school is from the Greenwich Hospital fund, so that there is no direct grant from the state. The estimates, however, must be submitted to Parliament, and are voted upon in the same manner as those of the Navy. The total, yearly required, is £20,000. The sum is gradually reducing year by year as the trades of the school become more thoroughly organized and efficient.

CHAPTER II.

ORGANIZATION.

The regulations in paragraphs XI and XII of the articles governing admission roughly outline the education given. The school is kept to its maximum as closely as possible, the number rarely falling below 990. At the date of writing there are 998. Of this number there are 120 in the nautical division, the remainder being in the general school.

The officers are as follows:

Superintendent (Captain Burney, R. N.)

One aide, who looks after the general discipline.

One clergyman (naval).

One medical officer.

One storekeeper and cashier (a naval paymaster).

One head-master.

Four schoolmasters.

One music-master.

One clerk.

Two school sergeants (acting as drill-masters).

Six school corporals, each of whom has charge of a company, and in addition has other defined duties, as follows:

No. 1 teaches sailmaking.

No. 2 teaches matmaking.

No. 3 has charge of mess-hall.

No. 4 teaches swimming.

No. 5 has charge of seamanship instruction.

No. 6 instructs in house painting.

Two seamanship instructors.

Two junior seamanship instructors.

The trade staff is given in another part of the paper.

The general school is divided into two watches; each watch is divided into two sections, A and B, of 220 boys each, each of which sections is under a master with a staff of four, sometimes five, pupil teachers. The section is subdivided into six classes, termed upper and lower first, upper and lower second, upper and lower third.

There are thus about thirty-six boys in each class, who in school are taught together. The term "class" in this case corresponds with the use of our word "section" at the Naval Academy.

As but one watch is at school at a time, there are but twelve classes at study. They are taught according to the standards laid down in the regulations of the new school code (1879). There are by these regulations six standards of proficiency, beginning with No. 1, which is of the most elementary character, requiring but the slightest knowledge

of reading and writing, notation and numeration, and rising in standard VI to a considerable proficiency in reading, writing, arithmetic, grammar, geography, and history. The three classes of the general school at Greenwich take as their standards III, IV, and V; the second part of the nautical school rises to the sixth, and the first part to the sixth with a greater general proficiency.

I give these standards in full. They are those which apply to all the elementary schools of England under the board of education, schools such as we know under the name of public schools; this name applying in England only to schools of the Eton and Rugby class.

Standards of examination.

28.	Standard I.	Standard II.	Standard III.	Standard IV.	Standard V.	Standard VI.
Reading	To read a short paragraph from a book, not confined to words of one syllable.	To read with intelligence a short paragraph from an elementary reading book.	To read with intelligence a short paragraph from a more advanced reading book.	To read with intelligence a few lines of prose or poetry selected by the inspector.	Improved reading.....	Reading with fluency and expression.
Writing	Copy in manuscript character a line of print, on slates or in copy-books, at choice of managers; and write from dictation a few common words.	A sentence from the same book, slowly read once, and then dictated. Copy-books (large or half-text) to be shown.	A sentence slowly dictated once from the same book. Copy-books to be shown (small hand, capital letters, and figures).	Eight lines slowly dictated once from a reading book. Copy-books to be shown (improved small hand).	Writing from memory the substance of a short story read out twice; spelling, grammar, and handwriting to be considered.	A short theme or letter; the composition, spelling, grammar, and handwriting to be considered.
					N. B.—An exercise in dictation may, at the discretion of the inspector, be given in place of either of the above.	
Arithmetic	Notation and numeration up to 1,000. Simple addition and subtraction of numbers of not more than four figures, and the multiplication table to 6 times 12.	Notation and numeration up to 100,000. The four simple rules to short-division (inclusive.)	Notation and numeration up to 1,000,000. Long division and compound addition and subtraction (money).	Compound rules (money) and reduction (common weights and measures).	Practice, bills of parcels, and simple proportion.	Proportion, vulgar and decimal fractions.
Grammar, geography, and history.	.....	To point out the nouns in the passages read or written.	To point out the nouns, verbs, and adjectives.	Parsing of a simple sentence.	Parsing with analysis of a "simple" sentence.	Parsing and analysis of a short "complex" sentence.
		Definitions, points of compass, form and motions of earth, the meaning of a map.	Outlines of geography of England, with special knowledge of the county in which the school is situated.	Outlines of geography of Great Britain, Ireland, and colonies.	Outlines of geography of Europe—physical and political.	Outlines of geography of the world.
				Outlines of history of England to Norman conquest.	Outlines of history of England from Norman conquest to accession of Henry VII.	Outlines of history of England from Henry VII to death of George III.

These standards are adhered to until the subject geography is treated. The course is then as follows:

In geography.—Elementary geography is taught. A map is appointed each half year for the whole school, which must be thoroughly learned.

In history.—A portion is appointed each half year for the whole school (both general and nautical) by the inspector of training schools.

The remaining subjects taught, English literature, mathematics, French, bookkeeping, navigation, and drawing, are reserved for the nautical school.

It must be borne in mind that all these boys, with the exception of those of the nautical school and those who fail to reach the standard of size, are expected to go on board the naval training ships for a year, before finally going afloat. In the training ships they take of course the highest rank, as they have already acquired as much as and more than a boy who enters the training service from civil life gets during his whole year's schooling on board.

The nautical school is divided into two divisions, the first consisting of fifty boys, the second of seventy. The latter are in two watches, and work on half time, as does the general school; the former attend school both morning and afternoon. The whole of the nautical school is under the charge of two masters and four pupil teachers.

The appointments to this school are made by selection, the boys of highest standing being chosen; but no boy is eligible after he has passed the age of fourteen and a half years. Those of the second part, who fail to pass into the first, take their places in the training ships as boys for general service. From seven to ten of the first division are selected as pupil teachers, to finally become naval schoolmasters; the remainder become ship's writers and ship's stewards' boys. Those who are selected for the two last positions undergo a careful training in naval bookkeeping. The samples of accounts which I saw kept by them were admirably done. The benefit of having a large class of such men in the service need not be dwelt upon.

The only difficulty, or rather drawback, that I see connected with it is that the education of the nautical school is such that the boy is trained for much better work than that to which he would be put in the service, so that he would naturally desire to seek a better position in civil life. This objection does not hold, however, so much in England, where the chances of advancement are few, as it would with ourselves, where the ability and education possessed by any one are not handicapped by regard for the previous condition of the person.

The following is the examination which the nautical school divisions are required to pass:

Subject.	First division nautical school.	Second division nautical school.
English literature.	Two hundred lines of poetry repeated, with knowledge of meaning and allusions; writing a paraphrase of a passage of easy prose.	One hundred lines of poetry got by heart, with knowledge of meaning and allusions. Writing a letter on a simple subject.
Mathematics.....	Algebra, including simple equations; Euclid, book I; trigonometry, the solution of plain triangles.	Algebra, including subtraction; Euclid, book I, propositions 1 to 15 inclusive.
French	Grammar, and translation into English of easy narrative sentences; ten pages of a French conversation.	Grammar to end of regular verbs; ten pages of a French vocabulary.
Bookkeeping	As in use in the paymaster's department of the Royal Navy.	Same.
Navigation	To do "day's work".....	Same.
Drawing.....	(Same for both divisions.) Freehand, model, and geometrical.	

In addition to this, all boys, whether of the general or nautical school, are taught singing, lessons being given as shown in the routine by a master to a class at a time.

I give, with the exception of those of the second class, copies of some of the examination papers set at the midsummer examination of this year, which will give a more succinct idea of what is required than a rehearsal of subjects.

ALGEBRA—NAUTICAL SCHOOL.

1. Find the sum of $4x^3-5ax^2+6a^2x-5a^3$, $3x^3+4ax^2+2a^2x+6a^3$, $-17x^3+19ax^2-15a^2x+8a^3$, $13ax^2-27a^2x+18a^3$, $12x^3+3a^2x-20a^3$.

2. Required the excess of $5a^2+4ab-3ac+bc$ above $3a^2+3ab+3bc-2c^2$.

3. Multiply $1-2x+3x^2-4x^3+5x^4+6x^5+7x^6-8x^7$ by $1+2x+x^2$.

4. Divide $a^5+a^3b^2+a^2b^3+b^5$ by a^2-ab+b^2.

5. When $a=5$, $b=0$, $c=1$, $d=2$, find the numerical value of $(a-2b+3c)^2-(b-2c+3d)^2+(c-2d)^2$.

6. Extract the square root of $9-24x-68x^2+112x^3+196x^4$.

7. Find the greatest common measure of $2x^5-4x^4+8x^3-12x^2+6x$, and $3x^5-3x^4-6x^3+6x^2+3x$.

8. Express in its simplest form the quantity: $\dfrac{x+y}{y}-\dfrac{2x}{x+y}+\dfrac{x^3-x^2y}{y^3-x^2y}$.

9. Solve the equation: $\dfrac{49}{8x+1}=\dfrac{70}{12x+1}$.

10. Find the value of x and y from the simultaneous equation: $ax+by=c^2$, and $\dfrac{a}{b+y}-\dfrac{b}{a+x}=0$.

11. Divide 21 into two parts, such that ten times one may exceed nine times the other by 1.

12. Solve the equation: $\sqrt{4+\sqrt{x^4-x^2}}=x-2$.

13. Solve the equation: $\dfrac{x+7}{x^2-7x}-\dfrac{x-7}{x^2+7x}=\dfrac{7}{x^2-73}$.

14. A person bought a number of pieces of cloth for £33 15*s.*, which he sold again at £2 8*s.* a piece, and gained as much by the transaction as one piece cost him; find the number of pieces.

TRIGONOMETRY AND NAVIGATION—NAUTICAL SCHOOL.

1. In the triangle A B C, given $B=90°$, $C=40° 46'$, $a=384$, find the other parts.

2. A ship sails north 100 miles, then east 50 miles; find the distance made good.

3. A light-house, whose height is 93 feet above the level of the sea, is observed from a ship to have an elevation of $2° 58'$; what is the distance of the ship from the light-house?

4. Find by logarithms the value of $\sqrt{.00023} \times \frac{28956}{257.32}$.

5. Two landmarks are 7 miles apart; a ship is stationed 5 miles from one, and $3\frac{1}{2}$ from the other; find the angle which they subtend from the ship.

6. In the triangle A B C, given $a = 629$, $b = 765$, $A = 25° \ 25' \ 25''$; find the other parts.

7. In the triangle A B C, given $a = 512$, $b = 627$, $C = 42° \ 53' \ 38''$; find the other parts.

8. Find the course and distance from A to B, given—
Lat. A, 48° 30′ N.; Long. A, 29° 50′ W.
Lat. B, 57° 10′ N.; Long. B, 37° 5′ W.

9. Required the compass course and distance from a place in Lat. 40° 23′ N., Long. 102° 10′ E., to another place in the same latitude and in Long. 103° 20′ E.; the variation of the compass being two points E., and the deviation 5° 30′ E.

10. Find by Mercator's method the Lat. and Long., in having given that the ship's course is N. 26° 30′ E., and her distance made good 482^m, and the point of her departure, Lat. 32° 30′ N., Long. 25° 24′ W.

11. Leaving a place in Lat. 38° 10′ S., Long. 152° 30′ E., I sail ENE. by compass 37 miles with wind SE., making $1\frac{1}{2}$ points leeway; var. 9° 25′ E., dev. 6° W. The wind now shifts to the E., and I change my course to SSE., and make two points leeway, and the deviation in this position of the ship's head is 4°, the variation as before. I now sail for six hours at the rate of 5 miles per hour; find my Lat. and Long.

12. Draw a blank form, showing how the journal or log is kept.

GEOMETRY.

1. Define an angle, a triangle, an obtuse angle, an acute-angled triangle, a parallelogram.

2. If two angles of a triangle be equal to one another, the sides also which subtend the equal angles shall be equal to one another.

3. The greater side of a triangle is opposite the greater angle.

4. If a straight line falling upon two other straight lines make the exterior angle equal to the interior, and opposite, upon the same side of the line; or make the interior angles upon the same side together equal to two right angles, the two straight lines shall be parallel to one another.

5. To describe a square upon a given straight line.

6. If a straight line be divided into two parts, the squares of the whole line, and of one of the parts, are equal to twice the rectangle contained by the whole and that part, together with the square of the other part.

7. To draw a straight line from a given point, either in the circumference or out of it, which shall touch a given circle.

FRENCH—NAUTICAL SCHOOL.

1. Give the French for the following words, with the article in the correct gender: Cheek, arm, plate, lamb, streets, dust, penholder, night.

2. Translate into English: Les cousins sont-ils là? Ils ne sont pas là, mais la filleule est ici. Avez-vous diné sans moi? Elles auront eu des chagrins.

3. Turn into French: Here is the owl. Is thy master the more patient of the two? Who will give me some ink? Charles will have a prize at the school.

4. Write out all the primary tenses of "être."

5. Write out all the compound tenses of the indicative of "avoir."

6. Write out the simple cases of "agir."

7. Translate into English: Quand Maurice disait, "Où donc est le petit sansonnet?" L'oiseau repondait aussitôt, "Me voilà." Le jeune Charles, fils d'un voisin, prenait un plaisir extrême à entendre le sansonnet et venait souvent le voir. Un jour Charles entra dans la chambre pendant que Maurice était sorti. Il s'empara bien vite

de l'oiseau, le mit dans sa poche et voulut s'esquiver. Mais dans le même instant le chasseur rentra. Voulant faire plaisir à son jeune voisin, il demanda comme d'habitude: "Où donc est le petit sansonnet?" Aussitôt l'oiseau, caché dans la poche du jeune garçon, cria de toutes ses forces, "Me voilà."

8. Translate into French: He has said his lesson better to-day. These boats have not any rudders. They did not speak a foreign tongue. His friends praised his humanity very much. These shoes are yours and these boots are mine.

ARITHMETIC—GENERAL SCHOOL.

First class.

1. A person bought 500 yards of cloth at 15*s.* 9*d.* a yard, and sold it at 16*s.* 3*d.* a yard; what did he gain?

2. Reduce £2,695 19*s.* 9*d.* to threepences.

3. My watch gains 37*m.* 3*s.* in twenty-four hours; how much would it gain in a year of 365 days?

4. How many grains difference are there between a pound of gold and a pound of butter?

5. If an article cost £2 11*s.* 8½*d.*, find by practice the cost of 4,321 articles.

6. Find by practice 10 tons 18 cwt. 3 qrs., at £10 18*s.* 3*d.* per ton.

7. Make out a bill for 31½ ells of holland, at 5*s.* 8*d.* per ell; 39¼ yds. Irish cloth, at 2*s.* 4*d.* per yard; 17½ yds. muslin, at 7*s.* 2½*d.* per yard; 13¾ yds. cambric, at 10*s.* 6*d.* per yard.

8. Make out a bill for 4¼ lbs. of mutton, at 10*d.* per lb.; 14½ lbs. of beef, at 11½*d.* per lb.; 10¾ lbs. lamb, at 1*s.* 4*d.* per lb.; 11¾ lbs. veal, at 1*s.* 1*d.* per lb.; and 15½ lbs. of pork, at 10½*d.* per lb.

9. What weight of sugar may be bought for £187 4*s.* when the cost of 6 cwt. 2 qrs. is £27 14*s.* 8*d.*?

10. A man's income for a year is £408 16*s.*; what does he receive for 15 days?

Third class.

1. Write in figures four million seven hundred thousand twenty-nine.
2. Write in words 27,041,205.
3. Add together 4,167,893, 271,896, 98,457, 879, 7,682,314, and 27.
4. From 72,148,063 take 59,673,598.
5. Multiply 8,637,415 by 8.
6. Divide 10,736,847 by 9.
7. Multiply 547,632 by 706.
8. Divide 4,167,813 by 278.
9. Add together £427 17*s.* 4½*d.*, £9,386 10*s.* 11¼*d.*, £2,018 12*s.* 9¾*d.*, £84,157 18*s.* 6¾*d.*, and £29 15*s.* 8¼*d.*
10. From £9,241 0*s.* 8*d.* take £8,765 12*s.* 11½*d.*

GRAMMAR—NAUTICAL SCHOOL.

1. Parse the words in the following sentence: "Reading furnishes the mind only with materials of knowledge; it is thinking which makes what we read our own."

2. What is the meaning of mood? Name the mood of each verb in the following: "In the next place look to your health, and, if you have it, praise God, and value it next to a good conscience."

3. Analyze the sentences:

(*a.*) "The baffled panther suddenly abandoned his prize."

(*b.*) "His soul proud science never taught to stray
Far as the Solar Walk or Milky Way."

(*c.*) "The bird that soars on highest wing
Builds on the ground her lowly nest."

HISTORY.

1. Name the sovereigns of the houses of Lancaster and York, with the dates of their accession.
2. Give an account of the wars with France during the reigns of Henry V and Henry VI.
3. Describe the social condition of the people of England during this period.

GEOGRAPHY—GENERAL SCHOOL.

First class.

1. Where are the following places situated, and for what are they remarkable, Oporto, Brindisi, Varna, Berne, Prague, Astrakhan, Hague, Berlin, Cartagena? Munich.
2. Describe the principal mountain ranges of Europe, giving the countries in which they are situated and their direction.
3. Draw a map of France.

Second class.

1. Describe the principal mountains and rivers of France and Spain.
2. Mention the countries which are washed by the North Sea and the Baltic, and name their capitals.
3. Enumerate in order, along the coast from east to west, the European capes in the Mediterranean and its inlets.

Third class.

1. Name the four principal points of the compass.
2. What do you mean by a map?
3. Define an island, a lake, a strait, an isthmus, a promontory. Give examples of each.
4. Mention the principal countries of Europe, with their capitals.

HISTORY—GENERAL SCHOOL.

(The history paper for the first class is the same as that for the nautical school.)

Second class.

1. What were the wars of the Roses?
2. Write an account of Joan of Arc.

I give none of the papers on religious knowledge, as I append the complete course, from which a better idea of the extent of the study will be gained. The "scheme" is arranged to cover two years.

Scheme for religious instruction, 1874–'76.

GENERAL SCHOOL.

1. The time for religious instruction to be from 9 to 9¾.
2. The Scripture history to be divided into the following four periods:

OLD TESTAMENT.

1. From the creation to the death of Joseph.
2. From the birth of Moses to the death of Joshua.
3. From the death of Joshua to that of Solomon.
4. The revolt of the ten tribes.
   The lives of Elijah and Elisha.

NEW TESTAMENT.

1. The life of Christ to the sending out the seventy (S. P. C. K.).
2. The remainder of Christ's life (S. P. C. K.).
3. The Acts of the Apostles; first 14 chapters.
4. The Acts of the Apostles; last 14 chapters.

The first of these periods to be taught in all the four classes during the half year commencing the Monday after October 16, 1874, the second during the next half year beginning April 1, 1875, and so on, thus finishing the course in two years.

The following twelve parables and miracles to be prepared by all the boys in the two years, three of each during each half year:

Parables.	*Miracles.*
The sower (Luke viii, 4–15).	The water turned into wine (John ii, 1–11).
Houses on rock and sand (Matthew vii, 24–27).	The withered hand healed (Matthew xii, 9–13).
The talents (Matthew xxv, 14–30).	The widow's son at Nain raised to life (Luke vii, 11–16).
The unmerciful servant (Matthew xviii, 21–35).	The draught of fishes (Luke v, 1–11).
The good Samaritan (Luke x, 30–37).	The tempest calmed (Matthew viii, 23–27).
The tares (Matthew xiii, 24–30, 36–43).	Five thousand fed (John vi, 5–14).
The prodigal son (Luke xv, 11–32).	One sick of the palsy healed (Mark ii, 1–12).
The importunate widow (Luke xviii, 1–8).	The centurion's servant healed (Luke vii, 1–10).
The pharisee and publican (Luke xviii, 9–14).	The issue of blood stanched (Luke viii, 43–48).
The rich fool (Luke xii, 15–21).	The ten lepers cleansed (Luke xvii, 10–19).
The rich man and Lazarus (Luke xvi, 19–31).	Christ walketh on the sea (Matthew xiv, 22–23).
The ten virgins (Matthew xxv, 1–13).	Blind Bartimeus healed (Mark x, 46–52).

The names of the books of the Old Testament to be committed to memory by all the boys in one half year, and those of the New Testament in the next.

The church catechism to be prepared as follows:

In the fourth class, to the end of the "duty toward my neighbor," with explanation.

In the third class, the whole with explanation.

In the second class, to the end of the "duty toward my neighbor," with explanation. Scripture proofs of "duty toward God."

In the first class, the whole with explanation. Scripture proofs of "duty toward my neighbor."

SELECTED DIVISION—NAUTICAL SCHOOL.

1. The time for religious instruction in the first class to be from 9 to 9¾ on Tuesdays, Wednesdays, and Fridays, and in the second class from 9 to 9½ every day.

2. The subjects taught in the Old Testament to be the same as those taught in the general school.

3. The subjects in the New Testament to be—
   1. Prophecies and their fulfillment.
   2. St. Matthew, v, vi, vii, xxv; St. Luke, ix, xxii, xxiii, xxiv; St. John, xi, xiv, xv, xvii.
   3. The Acts of the Apostles; first 14 chapters.
   4. The Acts of the Apostles; last 14 chapters.

4. On Sundays, the boys to be employed on the catechism with Scripture proofs, parables, and miracles, alternately.

Of the thoroughness of the instruction here detailed I have had every means of judging, as I visited the school at frequent and unexpected times, and the chances of really practical observation were as good as could be wished; I can only speak of it in the highest terms of praise. The proficiency of boys of thirteen years of age in such studies as French and algebra surprised me much; their mental advance speaks volumes for the system, which is now advocated by many of the men foremost in educational affairs in England. In the opinions of Edwin Chadwick, C. B., and of Edward C. Tufnell, esq., men most prominent in the late educational advances of England, the mental advance of the half-time pupil is far greater than that of one on full time. It seems generally conceded that young boys have a limit of attentiveness which may be estimated at about three hours at a time; any instruction or study after this is considered not only useless, but absolutely injurious for very young persons.

That the system is destined to a widespread application in our own country is certain. Its adoption has already (1870) been urged in Massachusetts, usually the foremost of our States in matters of this kind. Half the children of America are taken out of school by their parents at the age of twelve, because they must assist in the family support; this system will allow the child half the day in school and half the day at his trade, whether this trade is carried on in the school or out of it. Half the day at manual labor is quite sufficient for a boy or girl of such tender years, and the best of evidence goes to show that the half days' schooling is quite as much as is good for them. Of course an extended treatment of this subject is out of place in this paper, but, as a question relating to the national well-being, all must hope to see the adoption of a system which will take from parents of the wage class the incentive to withdraw from school their children at an age when school is most beneficial.

The great amount of religious instruction given is a striking point in this school and in the training ships. The result is that the men of the English service attend divine service as a matter of course, though no compulsion is put upon them, and there seems a degree of devotional spirit among them which is very striking. At every school which I had the pleasure of visiting, whether ashore or on board ship, grace is said or sung both before and after meals. Our own public-school systems necessarily elide much of this sort of training, but my observation of its effect in the many schools of various kinds which I saw in England could but strike me pleasantly.

The system of teaching in general is much the same as that in the naval training ships. The principle of putting boys of the same degree of advancement together is fully carried out, so that the teacher's power is not dissipated in endeavors to urge forward very backward boys, nor has he the inclination to give most of his attention to the more advanced ones. All the classes of the general school are taught by pupil teachers, with the exception of those in music.

I give herewith the results, taken quite at random, in the cases of some of the boys who were examined in July of this year. The scale upon which they are marked is that in which 100 is the maximum, so that the marks show the percentage of correct answers. Two sets of examination papers are printed and distributed, as in the training ships. The mistakes on which they are marked in spelling are those made while writing, this writing being entirely from dictation. I would call particular attention to the very few mistakes in this, which, when the age of these boys is considered, are remarkably few.

Results of examinations.

Age at examination.		Time in school.		School or class.	Reading.	Writing.	Spelling.	Arithmetic.	Religious knowledge.	Grammar.	History.	Geography.	Algebra.	Geometry.	French.	Trigonometry.	Navigation.
Yrs.	*m.*	*Yrs.*	*m.*														
14	6	3	9	First nautical	96.1	91.5	99.5	86.4	74.2	85.4	80.7	58.9	82.5	89.3	92.2	75.5	73.4
14	7	3	10	.....do	94.1	89.2	98.5	76.0	68.0	75.4	90.6	48.9	74.0	80.6	81.3	75.3	59.7
13	5	2	9	Second nautical	95.0	89.0	98.2	84.0	71.8	67.4	58.0	43.8	94.8	62.8	79.2	....	....
14	4	3	1	.....do	95.8	89.6	97.0	79.8	63.9	64.7	62.9	49.7	89.1	49.1	82.6	....	....
13	10	2	6	.....do	90.2	90.8	97.2	74.6	60.3	60.6	64.4	44.8	66.5	75.1	66.4	....	....
14	0	2	6	.....do	95.8	90.8	97.7	68.5	53.6	61.5	60.5	49.6	69.1	63.2	56.5	....	....
13	9	2	5	Upper first	92.8	91.6	97.1	85.7	65.5	67.2	80.0	72.0	....	....	....	....	....
13	8	2	6	.....do	87.7	89.0	90.5	79.6	78.3	59.0	77.2	73.8	....	....	....	....	....
12	11	1	10	Lower first	85.8	88.9	96.0	68.2	54.7	41.6	64.0	50.0	....	....	....	....	....
13	3	1	11	.....do	82.1	88.0	95.2	54.2	65.2	32.4	57.0	56.0	....	....	....	....	....
13	0	1	9	Upper second	85.6	90.3	96.8	62.9	71.4	38.4	48.2	20.0	....	....	....	....	....
12	10	1	6	.....do	83.1	92.0	97.0	69.3	65.6	56.4	31.4	31.8	....	....	....	....	....
12	3	1	9	Lower second	81.7	88.7	90.2	53.8	50.6	21.0	59.6	13.0	....	....	....	....	....
12	5	1	3	.....do	90.9	89.5	93.2	50.8	66.4	29.3	42.6	7.2	....	....	....	....	....
11	10	1	2	Upper third	84.5	88.5	97.9	93.3	73.0	37.0	(*)	34.0	....	....	....	....	....
12	2	1	3	.....do	75.4	89.3	98.4	94.4	81.0	46.2	....	42.6	....	....	....	....	....
12	0	0	10	Lower third	85.2	87.5	95.6	84.4	75.1	31.0	....	28.8	....	....	....	....	....
12	2	0	10	.....do	79.1	85.7	95.1	85.0	68.4	35.4	....	51.4	....	....	....	....	....

* No history in the third class.

CHAPTER III.

SEAMANSHIP INSTRUCTION.

The seamanship instruction is given under men who have as a rule served their time for pension in the Navy as petty officers, or who have nearly finished such time, and are allowed to come here and complete it. In both cases their pay comes from the funds voted for the school. They are men specially selected as fitted for the management of boys; a most important desideratum, as it requires a character of much patience and firmness to deal successfully with boys of such tender years. The course in seamanship is the same as that laid down on board the training ships; the course in signals is, however, omitted.

It may be mentioned here that on the walls of the seamanship rooms are painted many of the sketches which appear in Burney's Seamanship Manual, especially such as refer to the exercise of sails and spars; every difficulty that one is apt to meet with aloft is represented. The sketches are on a very large scale and well painted; they are constantly under the eyes of the boys, who thus become familiarized with them, and have a means of reference to any difficulty which may occur in their exercises on board their stationary training ship. The idea appears a peculiarly good one, and well worth adopting.

The models are on a large scale; in one room is a brig, on the deck of which fifteen boys can work. It is so pivoted forward, and arranged that it can be headed in any direction by the men at the wheel. I would call particular attention to this model, which appears to me by far the most practical I have ever seen; the masts, yards, and gear are on a good working scale, and all the details of handling ship can be performed. There are many other models of various kinds which need not, with the exception of the one just spoken of, be particularly mentioned. All are on such a scale as not to serve for mere show; the rigging, for instance, going over the mastheads is of a size sufficient to show every detail, and can be taken off and replaced easily.

The seamanship division does not include any boys under thirteen years of age; nor do any, until they arrive at this age, receive any instruction pertaining to seamanship, the whole of their school hours being devoted to other studies and to their trades.

ORGANIZATION FOR TRADE WORK.

Boys on entering are assigned to such trade as they appear to have decided inclination for. Of course some are found without leanings of any kind. If on assignment they are found unfitted for the work, they

are given one opportunity for change, after which their position is fixed. This work has no reference whatever to their school organization; boys of the first and third classes may be working together in the same room and at the same work.

The entire labor of the establishment is done by the boys and their instructors; the school is entirely self-supporting, short of furnishing material. The making of the clothing and bedding, the washing and ironing, the baking, cooking, plumbing, and carpenter work, are all done by them. Nor is this work of a flimsy character; the coats, frocks, and trousers are well made and well fitted. The jackets of the pupil teachers, the uniform of the band, and all the other articles I examined were good. Sewing-machines and machinery for shoemaking are extensively used; the stockings are all made by machinery, and the latest and best appliances are used in the laundry.

A tour through the workshops shows an animated and striking sight. Beginning at the east end, at the bakery, where twelve boys in each watch are employed, one passes thence to the laundry, where he finds the machinery for the washing, wringing, and drying all under the charge of boys, even to the engine, which is looked after by a small engineer of twelve or thirteen. The whole of this department is under the supervising care of one man. As one passes to the folding and ironing rooms the number of boys increases, and one finds a busy hive of industry, where more than a hundred boys in each watch are employed. When it is considered that last year 460,000 articles (or 9,000 a week) were washed and repaired, folded and stowed in their proper places, it is easily seen that even this large force is not an idle one. After this come the general repairs and shirtmaking, and after this the sockmaking and mending. Further on are the tailor-shops, where there are 110 of these very young tailors at work, both with the sewing-machine and the needle; so on through the shoemakers, gasfitters, carpenters, and all the other trades which have been enumerated. It may not strike every one as it did myself, but it was to me a most surprising sight. Nor were these boys with the pale faces and thin bodies of factory children. In every case there were ruddy and redundant health, bright eyes, and evident strength and vigor. Among the faces of the thousand boys, whom I saw so frequently that I became familiarized with their appearance, I saw none that were not fine and open. There was not a trace of vice, inherited or acquired. If it existed before entry to the school, it had passed away under the influence of the healthful *régime* of mingled work, study, and play.

On one side at least, however, these boys have, as far as physique is regarded, almost an ideal parentage. Their fathers are picked and trained men, vigorous and healthy in early boyhood, and with this vigor sustained by the good food and the regular and energetic life of the man-of-war's man through a twenty years' service in the Navy. After this twenty years' service they are generally found in the Coastguard, where much the same conditions of life practically obtain; so that, from

these fathers at least, these boys come fairly by the exceptional appearance they present. England does well to cherish such a race, and the yearly supply of two hundred boys from this school she is sure to find a good leaven for the others with whom they are thrown.

The occupations, and numbers in each of the occupations, are as follows:

Bandsmen	90	Washers, ironers, and folders	118
Tailors	170	Blacksmiths	12
Tailor-machinists (to work with sewing-machines)	30	Gasfitters	6
Laundry-tailors (to repair clothes in laundry)	100	Plumbers	6
Repairers of clothing (in shops)	50	Painters	12
Shirtmakers	20	Carpenters	36
Sailmakers	20	Coopers	6
Knitters	20	Bricklayers	8
Sockmakers and sockmenders	40	Barbers	2
Shoemakers	24	Bakers	24
Mattress-makers	8	Cooks (in kitchen)	14
Matmakers	18	Scullery	10
		Messengers, gate-boys, &c	26

The tradestaff, or persons employed to superintend the departments and iustruct the boys, is as follows:

Bandmaster	1	Carpenters	2
Master tailor	1	Painter	1
Journeymen tailors	4	Barber	1
Master shoemaker	1	Man to superintend washing-machinery	1
Journeymen shoemakers	3	Head washwoman	1
Blacksmith	1	Washwoman	1
Plumber	1	Baker	1
Engineer	1	Cook	1
Stoker	1	Head seamstress	1
Mason	1	Seamstresses	2
Bricklayer	1		
Master carpenter	1		

In addition to these there are the following employed about the school:

Gatekeeper	1
Laborers for general duty	2
Laborer as store-issuer (this last has with him for a time the boys who are to serve as ships' stewards)	1

In the hospital are:

Head nurse (woman)	1	Dispensary man	1
Nurses (women)	3	Cook (woman)	1

This makes a total of sixty-two persons connected with the school, besides the boys and pupil teachers, of whom there are at present 39. There is thus a grand total of 1,101 persons belonging to the establishment.

A definite idea of the amount of work done will be given by the following list during the past year:

Amount of trade work.

		Made.	Repaired.
In tailors' shops	Pieces	4, 159	.....
In shoemakers' shops	Pairs	1, 723	4, 261
In clothing room	Pieces	10, 240	.....
In laundry	"	.....	27, 669
In repairing room	"	2, 941	57, 021
Total		19, 063	88, 951

The number of articles washed in the laundry in the year ending June 30, 1879, was 460,190. The total value of industrial work done was £5,600, or $28,000. In washing the saving was over $4,700 by having it done by the boys.

One hundred and sixty-five wash-basins were placed in the new lavatory by boy labor, the plumbing and all other parts of the work being done by them. The repairs generally are done by the carpenter, plumbing, and other workshops of the establishment.

CHAPTER V.

MESSING, ETC.

For disciplinary and drilling purposes the boys are divided into eight companies, each under charge of a corporal. Each company has its separate dormitory, 85 feet long by 30 broad, in which the corporal also sleeps, it being a principle of the school that no boy shall ever escape the presence of an official. Care is taken that this supervision is not made too evident. There is no understanding on the part of the boy that he is necessarily subjected to such, but he comes to see in a short time that he has the eye of an officer upon all his actions and can never escape observation.

The bedsteads are iron, furnished with good mattresses, sheets, and blankets; the bed of the corporal in charge is on a platform elevated above the general level of the room. The lavatories, though conveniently situated with reference to the dormitories, are, however, quite distinct from them. Each boy has his own basin and an unlimited supply of water.

The arrangements for cleanliness in general are the most perfect I have seen. In addition to the lavatories, there is a bath 135 feet long and 60 broad, covered by a building 170 feet by 80. The bath is constructed of cement, and has, when flooded, a depth of water of 5 feet. The central portion, 100 feet in length by 30 in breadth, has a depth of but 3½ feet, for the convenience of very small boys: a bridge is thrown across the deeper to the shallower portion. All boys are here taught to swim during their first year in school. Each one has his place numbered and reserved for clothing, and every possible convenience is afforded for their comfort. On Saturday nights before going to bed, all the school is obliged to take a bath in this place, the water of which is at this time moderately warmed.

The arrangements for messing are the same as those on board the training ships, the boys being divided into messes of twenty each. The mess-hall, built in 1876, is a noble room 180 feet long and 35 broad. It is handsomely decorated in fresco, the decorations of course being nautical in character. Immediately adjacent and opening on it is the kitchen on the liberal scale characteristic of the English in this regard.

The boys in going to meals are formed in the gymnasium. At dinner formation the band is present and plays during the marching in.

The gymnasium, a building of which the school may well be proud, was built in 1874. It has a length of 200 feet, with a breadth of 80. The roof is constructed with a system of arched girders, leaving a per-

fectly clear space for exercise. All the adjuncts of the most modern buildings of the kind are among its equipments, and at one end is a stage used for theatrical and other representations, well furnished with excellent scenery and appliances. Frequent exhibitions here take place. There is at all times a class under instruction, numbering as a rule 36, between the hours of 9.30 and 12.30 of the morning, and 2 and 5 of the afternoon. At all other times the gymnasium is open, affording an excellent playground at all times, and especially in rainy whether. All formations take place here, and the details of boys are marched from here to the study rooms.

Frequent drills in infantry tactics take place, the ground used for this being the open space in front of the buildings, which is covered with asphalt to the extent of 1.5 acres. This asphalt has been but lately put down at a large expense, but with great benefit to the boys' health, as it has slope enough to carry off the rains and dry quickly. They thus avoid the damp feet arising from playing or exercising on wet ground. I witnessed many of the drills of all kinds, and was much impressed by their thoroughness and spirit. Nothing could have been better than the marching and exercises in general of the battalion. At the close of the year there was a series of exercises in which swimming took a prominent part. There were matches among all grades of the school, from pupil teachers down, for which prizes were awarded. These exercises included flat and hurdle races, jumping, heaving the lead (at which remarkable activity was shown for young boys), and tug of war. There was afterwards an exhibition of gymnastics, in which a large number took part. Shortly after this, the year ended with a theatrical performance given by the boys, and a presentation of prizes by the Prince of Wales, at which 90 prizes were presented, 21 of which were for excellence in the trades. These prizes were apart from those granted the pupil teachers by the science and art department of education board.

THE BAND.

The band numbers 90 boys. As many as can reach the standard are, after arriving at an age to leave (15½), sent to the training ships for further instruction, to serve finally as bandsmen in the fleet. Many of them act as buglers at the school also, and may finally go afloat in that capacity instead of as bandsmen. The bugle is used much more extensively in the English service now than it was even a few years since, replacing almost entirely the drum, over which it has many advantages. These have never been appreciated in our own service, on account of the want of a system of calls for the service in general, each bugler being at liberty to devise his own.

The band of the Greenwich School has, I believe, not been quite so successful a one as that of Feltham Industrial School, which has attained quite a celebrity for the boys turned out from it.

GOOD-CONDUCT BADGES AND REWARDS.

Candidates for good-conduct badges must send in their applications at the latter end of each month, in time to enable the successful candidates to have their names published on the first day of each month. After the names of all candidates are sent in, a list is made and sent to each boy's schoolmaster, that their conduct in school may be noted; then to their trademaster, that he may note their conduct and proficiency in the trade shop; next to the chief of the staff, for their general conduct out of school; after which it is taken to the superintendent for approval. A boy to obtain a badge must get a "very good character" from each of the above-named officers. Six hundred and sixty-one boys now have 1,251 badges. Petty officer boys receive pocket-money at the rate of two cents a week for second-class petty officers; four cents for first class; and six cents a week for chief petty officer boys.

Rewards are given twice a year, at midsummer and at Christmas. Prizes in July of this year were given to the pupil teachers for general attainments; best teacher; progress; and for best writer.

To the nautical school, for general attainments; mathematics; general subjects; religious knowledge; French; drawing; and good conduct. In the second division, one was given to the best steward's boy. In the general school, for general attainments and good conduct; for special attainments in each division of study; for seamanship; compass; smartest boy aloft; best sailmaker, &c.

In the trades, there were prize tailors; tailors' cutters; tailor machinists; shoemakers; laundry washers; laundry repairers; laundry ironers; knitters; bakers and barber; blacksmith; bricklayer; carpenter; cooper; gasfitter; glazier; mangler; matmaker; painter; plumber; shirtmaker; turner; capmaker; and sockmender.

The best in the band had prizes, as also the best in the choir; the cleanest mess-cook; the best petty officers of dormitories, divisions, and messengers.

In all, there were ninety prizes given, the articles ranging from a silver medal to Robinson Crusoe.

CHAPTER VI.

PUPIL TEACHERS.

I mention this subject under the Greenwich School, as it is here they receive the greater part of their training, and the service done the Navy in supplying such men is not the least of the work done by this place.

There are selected from the first class of the nautical school from seven to ten boys yearly (the number varying with the demands of the service), who are in time to become naval schoolmasters. After the selection, they undergo a six years' course, part of this time being employed in teaching the younger boys, both at Greenwich and on board the training ships. There are altogether forty-eight of these young men at this time, all but fourteen of whom are at the former place. Their course is divided into three periods of two years each. The first is passed at Greenwich under the title of junior pupil teacher; the second on board the training ship; the third again at Greenwich, with the title of senior pupil teacher. During the first period half the day is passed in teaching, the remainder at study. During the second period they teach during school hours, but have morning and evening recitations and study. During the third term they teach during the whole day, but have certain studies laid down, a feature of the whole six years' course.

The annexed table is a syllabus of the subjects of instruction.

A feature of the third part of the course are the model lessons given by the pupil teachers. These may be explained as lectures upon familiar subjects, interspersed with such questions to the class of boys forming the audience as may tend to bring out their thinking powers upon the subject in hand. The lecture, however, is attended by the head-master and an assistant, and by all the other senior pupil teachers who can be spared from the study-rooms. Notes of the lecture are taken by all these, and, after the dismissal of the class, criticisms upon the lecture are called for by the head-master, who likewise, as well as the assistant, gives his judgment upon it. Those, I heard, were carefully prepared, well delivered, and the lecturer handled his class well. The criticism to be undergone was sharp and trying.

A study of the syllabus will show that the education is in every way a broad and good one. That it is very thorough I am well convinced. I know of no students who undergo a greater amount of work, which in

GREENWICH HOSPITAL SCHOOL AND HER MAJESTY'S TRAINING SHIPS.

SYLLABUS OF SUBJECTS OF INSTRUCTION AND EXAMINATION OF PUPIL TEACHERS.

	1. Reading.	2. Repetition.	3. Penmanship and Spelling.	4. Composition.	5. Grammar and Literature.	6. Religious Knowledge.	7. Arithmetic and Algebra.	8. Geometry and Trigonometry.	9. Geography.	10. History.
Candidate	To read with fluency, ease, and expression.		*To write from dictation in a neat hand, with well-formed letters, correct spelling and punctuation, a passage of simple prose.		A general knowledge, with parsing a moderately easy sentence.	Outlines of Scripture History. Church Catechism.	Compound Rules, Simple Proportion, Easy Vulgar Fractions, Practice.		Definitions and general geography of the World.	
End of first year	Improved articulation and expression.	50 lines of poetry	*Ditto, with improvement	To write from memory the substance of a passage of simple prose read twice with ordinary quickness.	The meaning of the Latin prepositions (Morell's Essentials, pp. 1–39, and 56–64).	Old Testament history contained in Genesis. Gospel of St. Matthew or St. Luke* (1). Catechism, with Scripture illustrations, to end of Duty towards God.	Compound Proportion, Vulgar and Decimal Fractions. Easy Simple Equations.	Euclid Definitions, Book I, 1–32, with simple deductions.	General geography of Europe, with full knowledge of the British Isles* (1). Or,	The succession of English sovereigns, from Egbert to the present time, with dates. British history previous to William I.
End of second year	do	40 lines of prose	do	To write from memory the substance of a passage of easy poetry read with ordinary quickness.	Morell's Essentials. The whole.	Old Testament history contained in Exodus to the death of Moses. Gospel of St. Luke or St. Matthew* (2). Catechism, with Scripture illustrations, from Duty towards God to end.	Involution, Evolution, and Interest. Simultaneous Equations, Quadratic Equations, and easy Problems.	Euclid. Book I, II, with simple deductions. Elementary trigonometry (Hamblin Smith, chap. I–X).	General geography of Asia, with full knowledge of Palestine, with its divisions at different periods of sacred history* (2).	Outlines of British History from William I to the accession of Henry VII.
End of third year	do	100 lines (including the former 50) of the same poet as at the end of first year.	do	To write full notes of a lesson on a given subject.	Morell's Grammar and Analysis, pp. 1–50 and 66–82.	Joshua, Judges, Acts of the Apostles. Liturgy.—The order of Morning and Evening Prayer, and the Litany.	Stocks, Profit and Loss, Proportional Parts, and miscellaneous questions. Algebra.—Recapitulation, more advanced Problems.	Euclid. Book III, with easy deductions. Mensuration of plane surfaces.	North and South America† (1). or,	Outlines of British History during the Tudor and Stuart Dynasties.
End of fourth year	do	80 lines (including the former 40) of the same prose writer as at the end of second year.	do	To write from memory the substance of a passage from a prose author read once with ordinary quickness.	Morell's Grammar and Analysis, pp. 51–65 and 82–111. Recapitulation.	Saul, David, Solomon, St. John's Gospel. Liturgy.—The Collects, Epistles, and Gospel of the principal festivals. The Communion Service. Recapitulation of Scripture History.	Arithmetic.—Recapitulation. Algebra.—Recapitulation, more advanced Problems.	Euclid. Book IV, with easy deductions. Mensuration of plane surfaces and more difficult questions.	Africa and Oceanica† (2). Recapitulation.	Outlines of British History during the Brunswick Dynasty. Recapitulation.
End of fifth year	Prose and verse, with a distinct utterance, due attention to punctuation, and just expression.	300 consecutive lines of poetry from the work selected under Grammar.	Specimen of the penmanship used in setting copies of text hand and small hand; general character of the writing in the examination papers.	To write plain prose on a given subject.	To parse the words in, paraphrase, and analyze passages from the poem selected,* and answer questions on its language, style, and subject-matter.	A general account of the Prophets (Nicholl's Help, pp. 274–305). Special knowledge of the prophecies relating to the Messiah, and of the Epistle to the Hebrews† (1).	Arithmetic.—To work sums both mentally and on paper, to prove the rules, to form the figures well and arrange the worked sums methodically, and as good models for imitation. Algebra.—Progressions, Ratio, Proportion, Surds, and Logarithms.	Euclid. Books I, II, with deductions. Plane Trigonometry; the solution of triangles; and its application to questions in elementary navigation.	Political and commercial.—The British Empire. Physical.—The elementary course, Science and Art Department (see Science Directory).	Some specific part of the previous course thoroughly mastered from a perusal of standard histories.*
End of sixth year	To show improvement in the higher qualities of reading, such as expression, modulation of voice, and the correct delivery of long or involved sentences.	300 consecutive lines of poetry from the work selected under Grammar; a different author from that studied in fifth year.	Same as fifth year, but defects more severely visited with loss of marks.	do	do	A general account of the Epistles (Nicholl's Help, pp. 331–363). Special knowledge of Epistles to the Ephesians, Philippians and Colossians† (2).	Arithmetic.—The same as fifth year, but defects in method and neatness more severely visited with loss of marks. Algebra.—Problems, Permutations and Combinations, Mathematical Induction, Binomial Theorem.	Euclid. Book I, II, III, IV, VI, 1–8, with deductions. Spherical trigonometry, with reference to elementary nautical astronomy.	Political and commercial.—The colonies of foreign powers. Physical.—The advanced course, Science and Art Department (see Science Directory).	do
	The passages for repetition in poetry and prose must be of a secular character, and taken from some standard English author approved by the Inspector of Naval Schools. Just expression and knowledge of meaning with improvement each year are expected.		*A specimen of the penmanship used in setting copies of text hand and small hand. The general character of the writing in the examination papers will be marked.		*The poem for 1875 will be Shakspeare's King Richard III, and for 1876 Milton's Comus. The students of the fifth and sixth years will read together.	*The same Gospel will be read by the two years together; they will therefore alternate. Commence with (1) for 1875. †The students of the fifth and sixth years will here read together, so that the order these subjects will alternate. Commence with (1) for 1875.			Maps to be drawn in each year's subject. *The so two years to be taught in one class, so the order of the subjects will alternate. Commence with (1) for 1875. †Ditto.	*The two-year students will have the same subject. For 1875.—From Battle of Bosworth to death of Queen Elizabeth. For 1876.—Period from 1603 to 1660.

EENWICH HOSPITAL SCHOOL AND HER MAJESTY'S TRAINING SHIPS.

SYLLABUS OF SUBJECTS OF INSTRUCTION AND EXAMINATION OF PUPIL TEACHERS.

5. r and Literature.	6. Religious Knowledge.	7. Arithmetic and Algebra.	8. Geometry and Trigonometry.	9. Geography.	10. History.	11. Economy.	12. Music.	13. School Management and Teaching.	14. Other Subjects.	
knowledge, with a moderately easy	Outlines of Scripture History. Church Catechism.	Compound Rules, Simple Proportion, Easy Vulgar Fractions, Practice.	.....	Definitions and general geography of the World.					(1.) *Drill.* The students will pass, as being able to drill, during their sixth year.	
ag of the Latin pre- (Morell's Essen- 1–39, and 56–64).	Old Testament history contained in Genesis. Gospel of St. Matthew or St. Luke* (1). Catechism, with Scripture illustrations, to end of Duty towards God.	Compound Proportion, Vulgar and Decimal Fractions. Easy Simple Equations.	Euclid Definitions, Book I, 1–32, with simple deductions.	General geography of Europe, with full knowledge of the British Isles* (1). Or,	The succession of English sovereigns, from Egbert to the present time, with dates. British history previous to William I.	.....	The natural scale, and the intervals found in it. Shapes and relative values of notes and rests. Places of notes on the treble stave. Simple-common and simple-triple time.	During the course of year to give a lesson in presence of Inspector of Naval Schools.	(2.) *French.* Examination in grammatical questions and easy passages for translation into English. Progressive.	
Essentials. The	Old Testament history contained in Exodus to the death of Moses. Gospel of St. Luke or St. Matthew* (2). Catechism, with Scripture illustrations, from Duty towards God to end.	Involution, Evolution, and Interest. Simultaneous Equations, Quadratic Equations, and easy Problems.	Euclid. Book I, II, with simple deductions. Elementary trigonometry (Hamblin Smith, chap. I–X).	General geography of Asia, with full knowledge of Palestine, with its divisions at different periods of sacred history* (2).	Outlines of British History from William I to the accession of Henry VII.	.....	Relation of treble stave to bass. Places of notes on both. Scales and intervals altered by sharps and flats. Compound times.	To give an account of the organization of Greenwich Hospital School, the subjects taught, and the methods of instruction used.	(3.) *Drawing.* 1. Drawing free hand from flat examples. 2. Linear geometry by aid of instruments. 3. Linear perspective. 4. Drawing from objects. 5. Delineation of large letters, numbers, diagrams, and other objects of memory on the blackboard.	
rammar and Analy- -50 and 66–82.	Joshua, Judges, Acts of the Apostles. Liturgy.—The order of Morning and Evening Prayer, and the Litany.	Stocks, Profit and Loss, Proportional Parts, and miscellaneous questions. Algebra.—Recapitulation, more advanced Problems.	Euclid. Book III, with easy deductions. Mensuration of plane surfaces.	North and South America† (1). or,	Outlines of British History during the Tudor and Stuart Dynasties.	.....	The minor scale in its diatonic forms.	During the course of the year to give a lesson in presence of the Inspector of Naval Schools.		
rammar and Analy- -65 and 82–111. tion.	Saul, David, Solomon, St. John's Gospel. Liturgy.—The Collects, Epistles, and Gospel of the principal festivals. The Communion Service. Recapitulation of Scripture History.	Arithmetic.—Recapitulation. Algebra.—Recapitulation, more advanced Problems.	Euclid. Book IV, with easy deductions. Mensuration of plane surfaces and more difficult questions.	Africa and Oceania† (2)..... Recapitulation.	Outlines of British History during the Brunswick Dynasty. Recapitulation.	.....	The minor scale in its chromatic forms, and the chromatic intervals found in it.	To give an account of the organization of the schools of training ships, the subjects taught, and the methods of instruction used.	Examination in connection with Department of Science and Art (see Art Directory).	
he words in, para- d analyze passages oem selected,* and nestions on its tan- yle, and subject-	A general account of the Prophets (Nicholl's Help, pp. 274–305). Special knowledge of the prophecies relating to the Messiah, and of the Epistle to the Hebrews† (1).	Arithmetic.—To work sums both mentally and on paper, to prove the rules, to form the figures well and arrange the worked sums methodically, and as good models for imitation. Algebra.—Progressions, Ratio, Proportion, Surds, and Logarithms.	Euclid. Books I, II, with deductions. Plane Trigonometry; the solution of triangles; and its application to questions in elementary navigation.	Political and commercial.—The British Empire. Physical.—The elementary course, Science and Art Department (see Science Directory).	Some specific part of the previous course thoroughly mastered from a perusal of standard histories.*	Elementary questions in sanitary science, and on the mechanical and chemical principles, illustrated by machines; and articles of common domestic use.	(1.) Notation: The treble and bass staves, and the relation between them. (2.) Time: Simple-common and simple-triple. (3.) The scales: Major and minor, with the intervals (major and minor, perfect and other) found in both, and the chromatic intervals found in the latter. (4.) Transposition from one key to another, and transcription from one variety of time to another (as from $\frac{2}{3}$ to $\frac{3}{4}$).	(1.) To answer questions on the best methods of teaching Reading, Spelling, Writing, Arithmetic, and other common subjects of elementary instruction. (2.) On the art of oral teaching generally.	(4.) Navigation.—Elementary course, Science and Art Department (see Science Directory).	Elementary Statics (Hamblin Smith).
.....	A general account of the Epistles (Nicholl's Help, pp. 331–363). Special knowledge of Epistles to the Ephesians, Philippians and Colossians† (2).	Arithmetic.—The same as fifth year, but defects in method and neatness more severely visited with loss of marks. Algebra.—Problems, Permutations and Combinations, Mathematical Induction, Binomial Theorem.	Euclid. Book I, II, III, IV, VI, 1–8, with deductions. Spherical trigonometry, with reference to elementary nautical astronomy.	Political and commercial.—The colonies of foreign powers. Physical.—The advanced course, Science and Art Department (see Science Directory).	.....do	Elementary questions in political economy.	(1.) Notation: The alto and tenor staves, and their relations to the treble and bass. (2.) Classification of intervals, as perfect and imperfect consonant and dissonant. (3.) Resolution of individual dissonant intervals. (4.) Rudiments of harmony; position of chords; inversions of the triad; discords by suspension (on fundamental basses only); the discord of the dominant seventh in its direct form.	(1.) To answer, in writing, questions on the mode of teaching Geography, History, and Grammar. (2.) Question of moral discipline. To teach a class in the presence of the Inspector of Naval Schools.	Nautical Astronomy.—Elementary course, Science and Art Department (see Science Directory).	Elementary Hydrostatics.
for 1875 will be re's King Richard for 1876 Milton's The students of the sixth years will cher.	* The same Gospel will be read by the two years together; they will therefore alternate. Commence with (1) for 1875. † The students of the fifth and sixth years will here read together, so that the order these subjects will alternate. Commence with (1) for 1875.			Maps to be drawn in each year's subject. * These two years to be taught in one class, so the order of the subjects will alternate. Commence with (1) for 1875. † Ditto.	* The two-year students will have the same subject. For 1875.—From Battle of Bosworth to death of Queen Elizabeth. For 1876.—Period from 1603 to 1660.	Papers of a character similar to those set by the Education Department to students in Training Colleges.	No marks will be given to the paper on this subject to students of the sixth year, who have not passed in musical skill, vocal or instrumental, sufficient to teach a class to sing from note.	The report of the Head-Master, and the condition of the class taught by each Pupil Teacher, will be noted each half year.	* Instruction in these subjects will be given during the years spent at Greenwich.	

this case is a combined work of study and teaching. The subjects of this training bear every appearance of being studious, thoughtful persons; the recitations conducted by them and the lectures given, and which I had the pleasure of hearing, were such as to convince me that the course pursued must produce an excellent man. Altogether I cannot speak too highly of what I saw in connection with the pupil teachers. One may ask whether such men can be needed afloat? Under the present system of the English I should answer no. All their men go to sea with the basis of a sound education; there is no raw material to work upon, and the general supposition is that in a few years the naval schoolmaster will disappear from sea-going ships. The proper place of these men is on board the training ships, where a great number are employed, and their education at present is conducted chiefly with a view to their service in them.

I give at the end of this paper a full set of the examination papers set at the end of the last Christmas term, as it is only through them that a proper idea of the work done can be gained.

CHAPTER VII.

COST OF GREENWICH SCHOOL.

Salaries and allowances of officers.

	£	s.	d.
Superintendent (with residence)	500	00	00
Medical officer (with residence)	350	00	00
Chaplain (with residence)	200	00	00
Paymaster (with residence)	195	00	00
Clerk (with residence)	300	00	00
Head-master (with residence)	260	00	00
Four masters (with residences)	680	00	00
Music-master and organist (with residences)	100	00	00
Allowances to two masters for teaching French	50	00	00
Allowances for extra instruction to pupil teachers	100	00	00
Compensation for house duty	16	00	00
Total	2,751	00	00

Wages and allowance for clothing of servants, tradesmen, and others, forming the staff of Greenwich School.

	£	s.	d.
Two school sergeants	157	4	00
First-class school corporal and compass instructor	68	10	00
First-class school corporal and sailmaker	74	10	00
First-class school corporal and gymnastic instructor	74	10	00
First-class school corporal and matmaking instructor	74	10	00
Two second-class school corporals	119	00	00
Three seamanship instructors	290	00	00
Baker	77	00	00
Cook	65	16	00
Gate-porter	74	10	00
Bandmaster	104	12	00
Master tailor	97	00	00
Four journeyman tailors	268	00	00
Master shoemaker	97	00	00
Three journeyman shoemakers	201	00	00
Master carpenter	85	00	00
Joiner	85	16	00
Painter	92	00	00
Blacksmith	87	00	00
Plumber and gasfitter	87	00	00
Engineer	99	10	00
Stoker	71	16	00

	£	s.	d.
Bricklayer	81	16	00
Mason	85	00	00
Barber	40	16	00
Laborer for carding mattresses	53	16	00
Laborer for general duties	53	16	00
Laborer for store duties	57	16	00
Head seamstress	45	00	00
Two seamstresses	82	00	00
Man washer	54	00	00
Head washerwoman	42	00	00
Woman washer (infirmary)	41	00	00
Head nurse (infirmary)	67	00	00
Dispensary man (infirmary)	49	10	00
Cook (infirmary)	41	00	00
Three nurses (infirmary)	123	00	00
Nurses, temporary (infirmary)	41	00	00
Total for officers and staff	6,160	14	00

Contingencies and incidentals.

	£	s.	d.
Lighting with gas	450	00	00
Tithes	10	00	00
Drawing lessons	45	00	00
Monitorial allowances to pupil teachers	320	00	00
Books and stationery	325	00	00
Library	30	00	00
Musical instruments and music	30	00	00
Funerals	15	00	00
Expense of sending boys home	30	00	00
Games and treats for boys	100	00	00
Extra medical officer	35	00	00
Roman Catholic priest	25	00	00
Allowance to clerk for local audit	20	00	00
Pocket-money to petty-officer boys	50	00	00
Postage and miscellaneous	120	00	00
	1,605	00	00

Repairs and maintenance of buildings.

	£	s.	d.
Water supply, paving, &c	1,318	00	00
Provisions	7,500	00	00
Clothing and bedding	2,175	00	00
Stores	1,000	00	00
Medicines	100	00	00
Superannuation allowances	1,791	00	00
	13,884	00	00
Officers and staff	6,160	14	00
Contingencies and incidentals	1,605	00	00
Total	21,649	14	00
Abate contribution from naval fund	912	00	00
Cost of Greenwich School	20,737	14	00

Or about £20 8*s.* per boy.

Clothing allowance, Greenwich School.

Articles.	Boys' kit.	Band boys' kit.	Nautical school kit.	Articles	Boys' kit.	Band boys' kit.	Nautical school kit.
Cloth trousers	2	.....	2	Hat ribbons	2	.....	2
Serge trousers	1	.....	1	Boots	2	2	2
Duck trousers	2	2	2	Socks	2	2	2
Drill frocks	3	.....	3	Jackets	.....	.....	2
Serge frocks	2	.....	.....	Cloth tunics	.....	1	.....
Duck jumpers	2	2	2	Cloth trousers	.....	1	.....
Flannel shirts	2	2	2	Serge tunics	.....	1	.....
Striped shirts	3	3	3	Serge trousers	.....	1	.....
Silk handkerchiefs	1	.....	1	Caps (band)	.....	1	.....
Comforters	1	1	1	Brushes, clothes	1	1	1
Caps, Glengarry	1	1	1	Brushes, hair	1	1	1
Hats, white	1	.....	1	Combs	2	2	2
Hats, black	1	.....	1	Slippers	1	1	1

Dietary of Greenwich Hospital School.

Day of week.	Breakfast.	Extra for pupil teachers.	Dinner.	Extra for seamen's class.	Extra for pupil teachers.	Tea.	Extra for pupil teachers.	Supper to pupil teachers only.
Sunday	Bread, 8 ounces Cocoa, ½ ounce Sugar, ½ ounce Butter	8 drams.	Bread, 4 ounces Mutton, 8 ounces Flour, 4 ounces Suet, ¼ ounce Potatoes, 4 ounces Cabbage, 4 ounces Beer	4 ounces 2 ounces	6 ounces. ½ pint.	Bread, 8 ounces Butter, 6 drams Tea, 1½ drams Sugar, 6 drams Milk, ½ gill	2 drams 1 dram 2 drams	Bread, 6 ounces. Cheese, 1½ ounces. Beer, 1 pint.
Monday	Bread, 8 ounces Cocoa, ½ ounce Sugar, ½ ounce Butter	8 drams.	Bread, 4 ounces Mutton, 8 ounces Potatoes, 8 ounces Beer	4 ounces	6 ounces. ½ pint.	Bread, 8 ounces Butter, 6 drams Tea, 1½ drams Sugar, 6 drams Milk, ½ gill	2 drams 1 dram 2 drams	Bread, 6 ounces. Cheese, 1½ ounces. Beer, 1 pint.
Tuesday	Bread, 8 ounces Cocoa, ½ ounce Sugar, ½ ounce Butter	8 drams.	Bread, 4 ounces Beef, 6 ounces Potatoes, 8 ounces Beer	4 ounces	6 ounces. ½ pint.	Bread, 8 ounces Butter, 6 drams Tea, 1½ drams Sugar, 6 drams Milk, ½ gill	2 drams 1 dram 2 drams	Bread, 6 ounces. Cheese, 1½ ounces. Beer, 1 pint.
Wednesday	Bread, 8 ounces Cocoa, ½ ounce Sugar, ½ ounce Butter	8 drams.	Bread, 4 ounces Stock soup, ⅜ pint Peas, 4 ounces Beef Potatoes Flour Suet Beer Flour, for puddings, 4 ounces. Treacle, for puddings, 2 ounces.	4 ounces	12 ounces. 8 ounces. 4 ounces. ½ ounce. ½ pint.	Bread, 8 ounces Butter, 6 drams Tea, 1½ drams Sugar, 6 drams Milk, ½ gill	2 drams 1 dram 2 drams	Bread, 6 ounces. Cheese, 1½ ounces. Beer, 1 pint.
Thursday	Bread, 8 ounces Cocoa, ½ ounce Sugar, ½ ounce Butter	8 drams.	Bread, 4 ounces Mutton, 8 ounces Potatoes, 4 ounces Cabbage, 4 ounces Beer	4 ounces	6 ounces. ½ pint.	Bread, 8 ounces Butter, 6 drams Tea, 1½ drams Sugar, 6 drams Milk, ½ gill	2 drams 1 dram 2 drams	Bread, 6 ounces. Cheese, 1½ ounces. Beer, ½ pint.
Friday	Bread, 8 ounces Cocoa, ½ ounce Sugar, ½ ounce Butter	8 drams.	Bread, 4 ounces Beef, 6 ounces Potatoes, 8 ounces Beer	4 ounces	6 ounces. ½ pint.	Bread, 8 ounces Butter, 6 drams Tea, 1½ drams Sugar, 6 drams Milk, ½ gill	2 drams 1 dram 2 drams	Bread, 6 ounces. Cheese, 1½ ounces. Beer, ½ pint.

Dietary of Greenwich Hospital School—Continued.

Day of week.	Breakfast.	Extra for pupil teachers.	Dinner.	Extra for seamen's class.	Extra for pupil teachers.	Tea.	Extra for pupil teachers.	Supper to pupil teachers only.
Saturday	Bread, 8 ounces Cocoa, ½ ounce Sugar, ½ ounce Butter	8 drams.	Bread, 4 ounces Stock soup, ⅝ pint Peas, 4 ounces Celery seed, 1 pound (for 1,000 boys). Rice, for pudding, 4 ounces. Treacle, for pudding, 2 ounces. Beef Mutton Potatoes Beer	4 ounces	12 ounces. 14 ounces. 8 ounces. ½ pint.	Bread, 8 ounces Butter, 6 drams Tea, 1½ drams Sugar, 6 drams Milk, ½ gill	2 drams 1 dram 2 drams	Bread, 6 ounces. Cheese, 1½ ounces. Beer, ½ pint.

Salt ..... 5 drams daily for cooking and table.
Pepper ..... 6 lbs. } Weekly for 1,000 boys.
Mustard ..... 4 lbs. }

PUDDINGS.—Four festival days a year and Christmas day, to consist of the following proportions, namely, for 1,000 boys:

Flour	lbs.	370	Sugar	lbs.	50
Raisins	lbs.	120	Suet	lbs.	120
Currants	lbs.	60	Peel	lbs.	12
Eggs	No.	180	Spice	lbs.	7
Milk	qts.	60			

NOTE.—On Mondays, Tuesdays, Thursdays, and Fridays, half the rations will be made into sea pies (to consist of preserved or fresh meat, at the rate of 4 ounces for each boy, in lieu of his fresh meat ration). The dinner allowance of bread will not be issued to those messes for which the sea pies are cooked (but the "seamanship class" will get the 4 ounces of bread, and also 2 ounces of flour, in addition to the 4 ounces), 4 ounces of flour and ¼ ounce of suet will be issued for each boy on sea pies, and 100 pounds of vegetables (carrots and onions) for 1,000 boys, to be used in making the pies and soup, and 13 ounces of herbs for every 1,000 boys on soup. The dripping saved from the roast meat will be divided among the boys in turn to eat with their bread at breakfast.

Average, &c., in height, weight, and chest measurement.

Age.		Height in inches.					Weight in pounds.					Chest in inches.				
From—	To—	Average.	Maximum.	Minimum.	Range of maximum and minimum.	Gain.	Average.	Maximum.	Minimum.	Range of maximum and minimum.	Gain.	Average.	Maximum.	Minimum.	Range of maximum and minimum.	Gain.
10½	11	50.75	55	47	8	.....	56.25	70	46	24	.....	24.75	26.25	22	4.25	.....
11	12	52.9	57.5	47.25	10.25	2.15	61.5	92	48	44	5.25	29.95	28.5	22.5	6	1.2
12	13	53.15	62	48.15	13.85	.25	68.1	98	51	47	6.6	26.25	29.15	23	6.15	.3
13	14	57.95	65.5	50	15.05	4.8	80.75	122	66.25	56.75	12.65	27.15	32.5	25.5	7	.9
14	15½	59.15	67	53.75	13.25	1.2	93.75	126	69	57	13	29.75	33.15	26	7.15	2.6

CHAPTER VIII.

GENERAL ROUTINE OF GREENWICH HOSPITAL SCHOOL.

A. M.

6.30—Bugle sound, "rouse," turn out and make up beds.
6.45—Boys march to lavatories.
7.00—Bugle call for shoeblacks of sections.
7.15—Bugle call for cooks of messes.
7.20—Fall in for breakfast.
7.25—March to mess-hall.
7.30—Breakfast.
7.50—Boys marched out of mess-hall into gymnasium, and to be there told off in working parties.
8.00—Sick-call.
8.15—Trade boys of the watch fall in for inspection (in working clothes) by adjutant, after which to be marched to their respective trade-shops by petty-officer boy in charge.
8.30—Parade in gymnasium (of the boys who are to be at school). Inspection by company officers and chief of staff.
9.00—Superintendent's inspection. Prayers by chaplain.
9.15—Watch for school to be marched to school-rooms.
11.20—Dismiss for ten minutes. Boys in shops dismissed from work.

P. M.

12.30—Marched out of class-rooms.
12.35—Mondays, Wednesdays, and Fridays, drill (the two first days at infantry, the last day at fire quarters).
1.10—Dismiss from drill.
1.15—Bugle call for cooks of messes.
1.20—Dinner formation.
1.30—Dinner.
1.50—To be marched out of mess-hall to skylark.
2.15—Fall in to be marched to class and work rooms.
5.00—Dismissed to skylark.
6.00—Boys marched to class-rooms for evening study
6.40—Dismissed from study.
6.45—Bugle call for cooks of messes.
6.50—Formation for tea.
7.00—Tea.
7.20—Dismissed to skylark.
8.00—March to dormitories.
8.30—Rounds by chief of staff.
10.00—Rounds by company officer

During the warmer months the seamanship division (consisting of all boys over thirteen years of age) is exercised from 8 to 9 a. m., on board ship, in seamanship exercises.

CLASS ROUTINES.

I append the routines of the classes of the general school, to the understanding of which some explanation is necessary.

Those in the cases of the upper and lower classes are divided, in each day, by horizontal lines, the subjects above the line applying to the upper class, those below to the lower. Each routine covers two weeks; as, taking the upper first class in school on Monday morning, it is at trade work that afternoon and the forenoon of Tuesday, going into school again on Tuesday afternoon and on Wednesday morning; so that half of each day only is passed at school work.

It will be seen that each class gets two lessons a week in singing, a subject much taught in English schools generally. The boys seem to take great pleasure in this part of the course, in which many a lad has good musical powers trained, which might otherwise lie dormant through life. Their singing at grace before and after meals and in church is very stirring.

Routine of first class, upper and lower classes.

Day.	9.45 to 10.15.	10.15 to 10.30.	10.30 to 11.	11 to 11.20.	11.20 to 11.30.	11.30 to 11.45.	11.45 to 12.30.	2.15 to 2.30.	2.30 to 3.	3 to 3.30.	3.30 to 4.	4 to 4.30.	4.30 to 5.
Monday	Parables. Miracles.		Dictation. Reading or parsing.	Grammar. Dictation.	Interval.	Mental arithmetic.	Arithmetic.	Evening lessons.	Reading. Arithmetic.	Arithmetic. Arithmetic.	Arithmetic. Dictation.	Dictation. Reading.	Geography. Geography.
Tuesday	Old Testament. Old Testament.	Evening lessons.*	Singing. Singing.	Map-drawing. Dictation.					Reading. Arithmetic.	Singing. Singing.	Arithmetic. Dictation.	Dictation. Reading.	Geography. Geography.
Wednesday ..	Old Testament. Old Testament.		Dictation. Reading or parsing.	Grammar. Map-drawing or writing.					Reading. Arithmetic.	Writing. Grammar.	Arithmetic. Dictation.	Dictation. Reading.	History. History.
Thursday	New Testament. New Testament.		Dictation. Reading or parsing.	Grammar. Map-drawing or writing.					Reading. Arithmetic.	Arithmetic. Grammar.	Arithmetic. Dictation.	Dictation. Reading.	History. History.
Friday	New Testament New Testament.		Singing. Singing.	Map-drawing. Dictation.					Reading. Arithmetic.	Singing. Singing.	Arithmetic. Dictation.	Dictation. Reading.	Geography or history. Geography or history.

* These are questions upon lessons given out the evening before.

Routine of second class, upper and lower.

Day.	9.30 to 10.15.	10.15 to 10.30.	10.30 to 10.45.	10.45 to 11.20.	11.20 to 11.30.	11.30 to 11.45.	11.45 to 12.30.	2.15 to 2.30.	2.30 to 3.	3 to 3.30.	3.30 to 4.	4 to 4.30.	4.30 to 5.
Monday	Parables.	Evening lessons.*	Reading.	Singing.	Interval.	Mental arithmetic.	Evening Lessons.	Evening lessons.*	Arithmetic.	Reading.	Singing.	Dictation.	Geography.
	Miracles.		Singing.	Reading.					Dictation.	Singing.	Reading.	Arithmetic.	Geography.
Tuesday	Old Testament.		Grammar.	Reading.					Arithmetic.	Reading.	Arithmetic.	Dictation.	Geography.
	Old Testament.		Reading.	Grammar.					Arithmetic.	Dictation.	Arithmetic.	Reading.	Geography.
Wednesday ..	Old Testament.		Writing.	Grammar.					Grammar.	Writing.	Arithmetic.	Arithmetic.	History.
	Old Testament.		Grammar.	Writing.					Writing.	Grammar.	Arithmetic.	Arithmetic.	History.
Thursday	New Testament.		Reading.	Singing.					Dictation.	Reading.	Singing.	Arithmetic.	History.
	New Testament.		Singing.	Reading.					Arithmetic.	Singing.	Reading.	Dictation.	History.
Friday	New Testament.		Grammar.	Writing.					Arithmetic.	Spelling.	Reading.	Dictation.	History or geography.
	New Testament.		Writing.	Grammar.					Arithmetic.	Spelling.	Dictation.	Reading.	

*Questions npon lssons given out the evening hefore.

Routine for third class, upper and lower.

Day.	9.30 to 10.15.	10.15 to 10.55.		10.55 to 11.20.	Interval from 11.20 to 11.30.	11.30 to 11.45.	11.45 to 12.30.	2.15 to 2.30.	2.30 to 3.	3 to 3.30.	3.30 to 4.	4 to 4.30.	4.30 to 5.
Monday	Parables.	Singing.		Writing.		Mental arithmetic.	Arithmetic.	Lessons.	Arithmetic.	Singing.	Dictation.	Reading.	Geography.
	Miracles.	Singing.		Spelling.					Arithmetic.	Singing.	Reading.	Dictation.	Geography.
		*Evening lessons from 10.15 to 10.30.	10.30 to 10.55.										
Tuesday	Old Testament.		Writing.	Reading.					Arithmetic.	Dictation.	Grammar.	Reading.	Geography.
	Old Testament.		Reading.	Writing.					Arithmetic.	Reading.	Grammar.	Dictation.	Geography.
Wednesday*..	Old Testament.		Writing.	Reading.					Arithmetic.	Dictation.	Grammar.	Reading.	History.
	Old Testament.		Reading.	Writing.					Arithmetic.	Reading.	Grammar.	Dictation.	History.
Thursday* ...	New Testament.		Singing.	Spelling.					Arithmetic.	Singing.	Dictation.	Reading.	History.
	New Testament.		Singing.	Writing.					Arithmetic.		Reading.	Dictation.	History.
		10.15 to 10.30.	10.30 to 10.55.										
		*Evening lessons.											
Friday*	New Testament.		Reading.	Writing.					Arithmetic.	Dictation.	Grammar.	Reading.	Spelling.
			Writing.	Reading.					Arithmetic.	Reading.	Grammar.	Dictation.	Spelling.

*Questions upon lessons given out the evening before.

Ages of boys in Greenwich School.

	Ages.	Nos.
Senior pupil teachers	19 to 21	20
Junior pupil teachers and writers	15 to 17	19
Boys from	10½ to 11	57
Do	11 to 12	212
Do	12 to 13	260
Do	13 to 14	231
Do	14 to 15½	199
Total		998

PUNISHMENTS.

The punishments of the past year were 1.5 per cent. of the number in the school. The government of the school is mild. Caning is resorted to in extreme cases, but as there were only nine instances last year (two-thirds of the whole number of punishments) the discipline may certainly be said to be good.

HEALTH.

The average of deaths for several years has been two in a thousand. As in all large establishments for boys, ringworm is found the most troublesome disease. There were last year but seven cases of chilblains, which speaks well for the system of paving the play-ground, and thereby avoiding damp feet. The hospital arrangements of the school are all that could be desired.

CHAPTER IX.

EXAMINATION PAPERS SET FOR THE PUPIL TEACHERS.*

GREENWICH HOSPITAL SCHOOL.

PUPIL TEACHERS—FIRST AND SECOND YEARS.

Wednesday, November 27, afternoon.

(Time allowed, 3 hours.)

[Questions (*a*) are to be answered by the first year pupil teachers; those marked (*b*) by the second year pupil teachers.]

RELIGIOUS KNOWLEDGE.

1. (*a.*) Relate the dreams of Pharaoh which led to the advancement of Joseph. Describe the last days of Jacob.

(*b.*) Describe the ark of the covenant. Relate all you know of Jethro.

2. Write out any ten verses of our Lord's sermon on the mount.
3. Describe the triumphal entry of Christ into Jerusalem.
4. Write out and illustrate from Scripture the answer to the following:

(*a.*) "What is thy duty towards God?"

(*b.*) "What meanest thou by this word *sacrament?*"

GEOGRAPHY.

1. Write a full description of the country lying between Persia and the Sutlej.
2. Give the locality and a brief description of Khiva, Merv, Batoum, Kars, Tiflis, Iskenderun.
3. Describe fully the Russian Empire in Asia with regard to its boundaries, extent, physical characteristics, towns, and productions.
4. Draw a map of Palestine as it was in the time of our Saviour.

PUPIL TEACHERS—FIRST YEAR.

Tuesday, November 26, forenoon.

(Time allowed, 2½ hours.)

ARITHMETIC.

[N. B.—The *solution* must in every instance be given at *full length*. A correct answer, if unaccompanied by the solution, or if not obtained by an intelligible method, will be considered of no value.]

1. A man walks 18 m. 2 fur. 26 po. 3 yds. in 5½ hours; how long does he take to walk a mile and a half?

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* Several of the less important papers are omitted.

2. Reduce $\frac{3}{8}$ of a guinea to the fraction of a pound; and 20 feet $7\frac{1}{2}$ inches to the fraction of a mile.

3. If 1·6 of a sum of money be equal to ·375 of 8 shillings, what is the sum?

4. If I pay £169 19*s.* as wages to 29 men for 108 days' work, what amount must I pay for 12 days' work to 660 men?

5. What is the meaning of the words *abstract* and *concrete* as applied to numbers? Prove that 7 multiplied by 3 = 3 multiplied by 7.

ENGLISH HISTORY.

1. Name the first and last sovereigns of each English dynasty, with dates.

2. What parts of our coast were first visited by the Romans, Saxons, Danes, and Normans, respectively? From whence did these people come?

3. Describe the events which led (1) to the accession of Canute, and (2) to that of William the Conqueror.

PUPIL TEACHERS—FIRST YEAR.

Wednesday, November 27, forenoon.

(Time allowed, $2\frac{1}{2}$ hours.)

ALGEBRA.

1. Find the value of $x^3 - 2xy^2 + y - 1$ when $x = 2$, $y = 3$.

2. Add together $a^2 - 3ab - \frac{14}{21}b^2$, $ab - \frac{1}{3}b^2 + d^2$, $2ab - \frac{1}{3}d^2$, $2b^2 + c^2 - \frac{2}{3}d^2$.

3. Divide $\frac{4a(a^2 - x^2)}{3b(c^2 - x^2)}$ by $\frac{a^2 - ax}{bc + bx}$.

4. Solve the equation: $\frac{x+6}{4} - \frac{16-3x}{12} = \frac{25}{6}$.

5. Find the value of x from the following: $\frac{6a+13}{15} - \frac{3x+5}{5x-25} = \frac{2x}{5}$.

EUCLID.

1. What do you understand by a definition in Euclid? Give a definition of parallel straight lines.

Write out the 12th axiom.

2. To bisect a given rectilineal angle. Write out this proposition and explain why in your construction you describe the equilateral triangle "on the side remote from" the vertical angle.

3. Demonstrate prob. XXIV.

4. What do you mean by a corollary? Write out the corollaries to the theorem: If two straight lines cut one another the vertical angles shall be equal.

5. If two straight lines bisect each other at right angles, any point in either of them is equidistant from the extremities of the other.

PUPIL TEACHERS—FIRST YEAR.

Tuesday, November 26, afternoon.

(Time allowed, $2\frac{1}{2}$ hours.)

GRAMMAR.

1. Give the meaning of the Latin prepositions *sub, inter, de, trans, post, ob.* Show what is the force of each in the following English words: Depart, postpone, subtract, translate, object, interrupt, detract, subdue, transatlantic.

2. Explain how the possessive case is written in English. Give any exceptions to the general rules.

3. Write a good definition of a verb. Explain why the definition is imperfect when the verb is simply stated to be a word which expresses action.

4. Write out the principal rules of punctuation.

5. Parse fully:

> And now there came both mist and snow,
> And it grew wondrous cold;
> And ice, mast-high, came floating by,
> As green as emerald.

MUSIC.

1. Make a table showing the relative values of all kinds of notes with their corresponding rests.

2. Explain fully the construction of the major diatonic scale.

3. Write out three bars of music in $\frac{2}{4}$, $\frac{3}{4}$, $\frac{3}{8}$, and $\frac{3}{2}$ times, respectively.

4. Define diatonic, major, scale, key, clef, bar, and semitone.

5. What do you understand by the following: Allegro, rall., dim., *ff.*, da capo, adagio.

HER MAJESTY'S TRAINING SHIPS.

PUPIL TEACHERS—THIRD YEAR.

Wednesday, November 27, afternoon.

(Time allowed, 2½ hours.)

RELIGIOUS KNOWLEDGE.

1. Mention events in the period from Joshua to Samuel, connected with the following places: Shiloh, Kirjath-jearim, Mount Ephraim, Jabesh-Gilead, Dan, Gaza.

2. Give a history of the last days of Joshua.

3. State briefly who the following were: Hannah, Naomi, Manoa, Jephthah, Nun, Achan.

4. Write out all that you know of Barnabas.

5. Give an account of Paul's speech in the presence of Agrippa.

6. Describe the arrangement of the order of morning prayer up to the Apostles Creed. Write out the different responses in the litany.

PUPIL TEACHERS—THIRD YEAR.

Tuesday, November 26, afternoon.

(Time allowed, 3 hours.)

[N. B.—The *solution* must in every instance be given at *full length*. A correct answer, if unaccompanied by the solution, or if not obtained by an intelligible method, will be considered of no value.]

ARITHMETIC.

1. Explain, as to a class, the rules for multiplication and division of decimals.

2. If .875 lb. cost .93 shillings, what will be the cost of $2\frac{11}{12}$ cwt.?

3. By selling tea at 4*s.* 8*d.* a pound, a grocer clears one-seventh of his outlay: what profit per cent. will he clear by selling the same tea at 5*s.* a pound?

4. What is the interest on 30,029 rupees 4 annas 6 pice at 4½ per cent.?

Give the result in English money when a rupee is worth 1*s.* 10*d.*; the rupee containing 16 annas, and the anna 12 pice.

5. A man has £5,000 stock in the 3 per cents, which he sells, and invests the proceeds in the 3½ per cents at 87½. If the increase in his income be £5, what is the price of the 3 per cents?

ALGEBRA.

1. Take out of brackets, $a-(x-a)-[x-(a-x)]$. Give the value of this when $a=3$ and $x=-3$.

2. Multiply $x^2-\frac{1}{2}x+\frac{3}{4}$ by $\frac{1}{2}x+2$.

3. Divide x^4-81 by $x-3$.

4. Solve the equations:

(1) $$x+\frac{3x-5}{2}=12-\frac{2x-4}{3}.$$

(2) $$\left.\begin{aligned}2x+3y+4z&=16\\3x+2y-5z&=8\\5x-6y+3z&=6\end{aligned}\right\}$$

(3) $$x^2-x+5\sqrt{2x^2-5x+6}=\tfrac{1}{2}(3x+33).$$

5. A bankrupt owes A twice as much as he owes B, and C as much as he owes A and B together; out of £300, which is to be divided among them, what must each receive?

6. There is a certain number of which the cube root is one-fifth of the square root; find it.

PUPIL TEACHERS—THIRD YEAR.

Monday, November 25, afternoon.

(Time allowed, 3 hours.)

EUCLID AND MENSURATION.

1. If two circles touch one another internally, they shall not have the same center.

2. A segment of a circle being given, to describe the circle of which it is a segment.

3. If two straight lines cut one another within a circle, the rectangle contained by the segments of one of them shall be equal to the rectangle contained by the segments of the other.

4. The circles described on the equal sides of an isosceles triangle as diameters will intersect at the middle point of the base.

5. The three sides of a triangle are 20, 30, and 40 feet; find its area.

6. What is the circumference of a circle whose diameter is 5.75 yards?

7. Investigate an expression for the area of a regular polygon in terms of its sides.

8. A piece of land $ABCD$, of which the sides are straight, measures from A to C 1,260 feet, and the shortest lines to AC from B and D respectively measure 580 and 460; find the area.

PUPIL TEACHERS—THIRD YEAR.

Monday, November 25, forenoon.

(Time allowed, 2½ hours.)

GEOGRAPHY.

1. Define the term Oceania. Name the islands belonging to Great Britain, Spain, and Holland, respectively, in Oceania.

2. What races principally people Oceania? Describe the peculiarities of these races.

3. Write what you know of the physical character of the islands of the Pacific and of the Asiatic Archipelago, and mention their chief productions.

4. Name and give the locality of the chief mountain chains and rivers of Africa. Describe their direction. Mention the principal towns on banks of latter.

5. Describe the position of, and state what gives importance to, the following places: Brisbane, Honolulu, Easter I., Hobart Town, Ascension.

6. Draw a map of Africa, putting in the leading physical features; also the chief towns in the British, French, and Turkish possessions.

Pupil Teachers—Third Year.

Tuesday, November 26, forenoon.

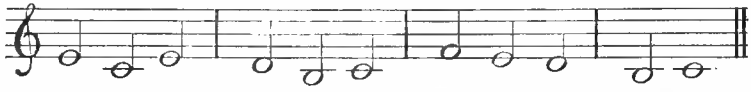
(Time allowed, 2½ hours.)

HISTORY.

1. Describe the events in English history connected with the names of Francis I of France, Philip II of Spain, and Mary Queen of Scots.
2. Give your opinions on the characters of James I and Charles II, illustrating what you say by acts of their reigns.
3. What were the principal features of the rule of Oliver Cromwell? Explain how his policy influenced public opinion abroad.
4. Write a history of the reign of Queen Anne.

MUSIC.

1. Write out the following scales: B (Si) minor, A (La) major, F (Fa) minor, and G (Sol) minor, both ascending and descending.
2. Make a table of compound times, and give specimens of each.
3. Show in what respects the scale B♭ (Si flat) *minor* differs from the scale of B♭ *major*.
4. Write the following in the bass clef, retaining the same pitch:



5. What do you understand by the following terms used in music: Scale, key, clef, diatonic, tone, interval, mode, stave, and signature?

Senior Pupil Teachers—Fifth and Sixth Years.

Monday, December 2, forenoon.

(Time allowed, 20 minutes.)

MENTAL ARITHMETIC.

N. B.—This paper is not to be opened till the examiner in charge gives the word. The answers are to be entered on the page opposite to the question. No erasures or alterations are permitted. *They will be marked as errors.*

(Write your name in full on this page.)

Questions.

1. Multiply 786 by 55.
2. Divide 450 by .375.
3. Find the value of $\frac{2}{3}+\frac{3}{4}+\frac{5}{6}$.
4. Reduce 1 week 3 days to the decimal of 7 weeks 1 day.
5. Find the value of 84^2.
6. Find a mean proportional between 49 and 81.
7. Find the value of 280 articles, at 19*s.* 6*d.* each.
8. Find the value of 970 articles, at 10½*d.* each.
9. Find the value of 10½ dozen articles, at 1*s.* 6*d.* each.
10. Find the annual value of 8 acres 3 roods 10 poles, at £3 5*s.* the acre.
11. What is the value of 7 ounces, at 3*s.* 4*d.* per pound avoirdupois?
12. What is the value of 2 pounds, at £2 18*s.* 4*d.* per cwt.?
13. Find the simple interest on £825 for 2 years, at 5 per cent. per annum?

14. The buying price of goods was £6 6*s.* 8*d.*; lost 5 per cent; what was the selling price?

15. What is the true discount on £525 for 1 year at 4 per cent.?

Senior Pupil Teachers—Sixth Year.

Monday, December 2, afternoon.

(Time allowed, 3 hours.)

ALGEBRA.

1. If $\frac{a}{b} = \frac{c}{d}$, prove that $\frac{a+b}{a-b} = \frac{c+d}{c-d}$ and $\frac{a-b}{a+b} = \frac{c-d}{c+d}$.

Illustrate how this is a useful formula in solving many equations.

2. Solve the equations:

(1) $$\frac{ad - bc}{d(c+dx)} + \frac{b}{d} = \frac{2a - bx}{c + dx}.$$

(2) $$\left.\begin{aligned} \frac{3x - 5y}{2} + 3 &= \frac{2x + y}{5} \\ 8 - \frac{x - 2y}{4} &= \frac{x}{2} + \frac{y}{3} \end{aligned}\right\}$$

(3) $$\frac{\sqrt{a} + \sqrt{a - x}}{\sqrt{a} - \sqrt{a - x}} = \frac{1}{a}$$

(4) $$x^4 - 14x^2 + 40 = 0.$$

3. A certain number is formed by the product of three consecutive numbers, and if it be divided by each of them in turn, the sum of the quotients is 47. Find the number.

4. Expand by the Binomial Theorem $(2x - 3y)^5$.

5. On how many days can five persons be placed in different positions about a table at dinner?

6. From the investigation of the extraction of the square root of an algebraical expression, prove the rule for the extraction of the square root of a number.

7. Find the continued product of $x - a$, $x + a$, $x^2 - ax + a^2$, and $x^2 + ax + a^2$.

8. Given the log 2 = .301030, and log 7 = .845098, write down the legarithms of 5, 4916, .0007, 3.5, and 200,000.

Senior Pupil Teachers—Sixth Year.

EUCLID.

(Time allowed, 3 hours.)

1. The straight lines which join the extremities of two equal and parallel straight lines towards the same parts are also themselves equal and parallel.

2. To divide a given straight line into two parts so that the rectangle contained by the whole and one of the parts may be equal to the square on the other part.

3. The opposite angles of any quadrilateral figure inscribed in a circle are together equal to two right angles.

4. To describe a circle about a given square.

5. If the vertical angle of a triangle be bisected by a straight line which also cuts the base, the segments of the base shall have the same ratio which the other sides of the triangle have to one another; and if the segments of the base have the same ratio which the other sides of the triangle have to one another, the straight line drawn from the vertex to the point of section shall bisect the vertical angle.

6. Two angles are supplementary, and the greater is double of the less; find what fraction the less is of a right angle.

7. A circle can always be described so as to pass through three points, not in the same straight line, and only one circle can be so described.

8. Find a point in the diagonal of a square produced, from which if a straight line be drawn parallel to any side of the square, and meeting another side produced, it will form together with the produced diagonal and produced side a triangle equal to the square.

Senior Pupil Teachers—Sixth Year.

SPHERICAL TRIGONOMETRY.

(Time allowed, 3 hours.)

1. Prove that every section of a sphere made by a plane is a circle.

2. In spherical triangle ABC, given $a = 87° 10' 15''$, $b = 62° 36' 45''$, and $c = 100° 10' 15''$; find A, B, and C.

3. In spherical triangle ABC, given $a = 119° 42' 15''$, $b = 108° 4' 18''$, and $B = 99° 21' 15''$; find A.

4. In spherical triangle ABC, given $b = 76° 42'$, $c = 89° 10' 30''$, and $A = 96° 32'$; find a.

5. In spherical triangle ABC, given $A = 90°$, $a = 100° 42'$, $B = 78° 10'$; find the other parts.

6. The Sun rose E. 37° 30′ N., at a place in lat. 64° 29′ 15″; what was his declination?

7. Required the distance on arc of great circle between Mauritius and C. Leeuwin, given—

Mauritius.....Lat. 20° 10′ S.; Long. 57° 30′ E.
C. Leeuwin.....Lat. 34° 19′ S.; Long. 115° 6′ E.

8. Given latitude 30° 17′ S., Sun's true altitude 18° 44′ 45″ (east of meridian), and declination 10° 17′ 45″ S.; find the hour angle.

Senior Pupil Teachers—Sixth Year.

Thursday, December 5, forenoon.

(Time allowed, 2 hours.)

HYDROSTATICS.

1. Describe the action of the fire-engine.

2. Explain clearly why a balloon ascends.

3. By what means may any force, however small, be made to support any weight, however large? Describe any application of the principle.

4. A piece of wood, which weighs 57 lbs. in vacuo, is attached to a bar of silver weighing 42 lbs., and the two together weigh 38 lbs. in water; find the specific gravity of the wood, that of water being 1, and that of silver 10.5.

5. If a body floats on a fluid two-thirds immersed, and it requires a pressure equivalent to 2 lbs. just to immerse it totally, what is the weight of the body?

6. Write out a description of the common air-pump, and explain its action.

7. Give the number of degrees in Fahrenheit's and Reaumur's scales respectively which correspond to 15° and —15° of the centigrade scale.

8. Show that the pressure of the atmosphere is accurately represented by the weight of the column of mercury in the barometer.

9. Could a siphon be employed to draw water out of the hold of a ship floating in a harbor? Explain your answer.

Senior Pupil Teachers—Sixth Year.

Tuesday, December 10, forenoon.

(Time allowed, 3 hours.)

GEOGRAPHY.

1. Describe the circulation between air and ocean.
2. Give a full account of the currents of the North Atlantic Ocean.
3. Describe generally the three systems of which the rivers of Europe form a part Enumerate the rivers of Europe belonging to each system, and describe the areas they drain.
4. Mention the different kinds of cereals, and then give their geographical distribution.
5. Name the portions of the globe in which the French, Spanish, Portuguese, and Dutch have respectively made their principal attempts at colonization.
6. Describe the locality of the French Possessions in Asia and Africa, and mention the importance of each.
7. Enumerate the principal colonial possessions of the Netherlands in the East Indies, and describe fully the most important one.
8. Draw maps of the colonial possessions of Spain in the West Indies.

Senior Pupil Teachers—Sixth and Fifth Years.

HISTORY.

Reigns of Anne, George I, and George II.

(Time allowed, 3 hours.)

1. Give the history of the event which caused the Union Jack to be adopted as the national flag.
2. Write a full account of the treaty of Utrecht.
3. Show how Walpole deserves the epithet of "the first and greatest of our peace ministers."
4. Discuss the importance of laws relating to the duration of Parliament. Give an account of the septennial act.
5. Describe the struggle for power in India between the English and French during this period.
6. Give an account of John Wesley.

Senior Pupil Teachers—Fifth and Sixth Years.

Composition, Grammar, and Literature. (The special subject, Pope's Essay on Man.)

(Time allowed, 3 hours.)

1. Give a succinct account of the design and argument of the Essay on Man.
2. Paraphrase the passage:

> Heav'n forming each on other to depend,
> A master, or a servant, or a friend,
> Bids each on other for assistance call,
> 'Till one man's weakness grows the strength of all.
> Wants, frailties, passions, closer still ally
> The common int'rest, or endear the tie.
> To these we owe true friendship, love sincere,
> Each home-felt joy that life inherits here;
> Yet from the same we learn, in its decline,
> Those joys, those loves, those interests to resign;
> Taught half by reason, half by mere decay,
> To welcome death, and calmly pass away.

3. Parse the following, and explain the construction:

> To each unthinking being, heaven a friend
> Gives not the useless knowledge of its end.

4. Analyze the following passages:

(*a*) In human works, tho' labour'd on with pain,
A thousand movements scarce one purpose gain;
In God's, one single can its end produce;
Yet serves to second too some other use.

(*b*) Order is heav'n's first law; and this confest,
Some are and must be greater than the rest,
More rich, more wise; but who infers from hence
That such are happier, shocks all common sense.

5. Comment on the following lines, especially the words in italics:

(*a*) The blest to-day is as completely so,
As who began *ten* thousand years ago.

(*b*) Still by himself *abus'd* or disabus'd.

(*c*) Self-love, the spring and motion, *acts* the soul.

(*d*) Like good Aurelius let him *reign* or *bleed*,
Like Socrates, that man is great indeed.

6. Explain the following allusions:

(*a*) Correct old time, and regulate the sun.

(*b*) Or hears the hawk when Philomela sings?

(*c*) Why drew Marseilles' good bishop purer breath,
When nature sicken'd, and each gale was death!

(*d*) This world, 'tis true,
Was made for Cæsar—but for Titus too.

7. Quote any allusions in the Essay on Man to the following contemporaries of Pope: Bolingbroke, Eugene, Marlborough, Newton, De Moivre.

SENIOR PUPIL TEACHERS—SIXTH YEAR.

Wednesday, December 4, *afternoon.*

(Time allowed, 3 hours.)

POLITICAL ECONOMY.

1. Detail and illustrate the circumstances which increase the productiveness of land.
2. What are the functions of money? Show that gold and silver combine all the qualities which the substance selected as money should possess.
3. Describe the effect on wages of a local decline in profits, of increased efficiency of labor, and of free competition.
4. Explain fully the following: "When there is an exchange between two countries, the profit of each country is in inverse ratio with its demand for the imported goods."
5. Define direct taxation. Show that direct taxation on manufactured commodities is impracticable.
6. Show the fallacy and evils of the idea that one man's gain is another's loss.

SENIOR PUPIL TEACHERS—SIXTH YEAR.

Friday, December 7, *afternoon.*

(Time allowed, 3 hours.)

SCHOOL MANAGEMENT.

1. What do you consider to be included in the moral education of children? How is it to be carried out?

2. What place would you give to the cultivation of (1) the imagination, (2) the memory of children placed under your charge?

3. Describe the advantages of physical education for the young. Explain why sunlight and good ventilation are indispensable.

4. Describe fully the effect of systematic instruction in singing in the education of children.

5. What is the object of lessons in composition? How would you teach both oral and written composition?

6. Write out a system of lessons on geography, under different general heads, from the most elementary stage to the most advanced.

7. Show the advantages of treating a short period of history fully, over directing the attention of your pupils only to a general outline of an extended period. To what classes would this system specially apply?

Senior Pupil Teachers—Sixth and Fifth Years.

RELIGIOUS KNOWLEDGE.

(Time allowed, 3 hours.)

1. Give a list of the epistles of St. Paul, arranged in chronological order; state their probable dates, and the places whence they were written.

2. State fully all that you can gather respecting the apostle during the period when he wrote the epistles to the Ephesians, Philippians, and Colossians.

What reasons are there for considering the first named of these epistles to have been a circular letter sent to a group of churches?

3. Complete the following passages and explain them:

(1.) [the mystery] "which in other other ages was not made known . . . in Christ by the gospel."

(2.) "Wherefore take unto you the whole armor . . . . which is the word of God."

(3.) "For our conversation is in Heaven . . . . all things unto himself."

(4.) " . . . . (touching whom ye receive commands; if he come unto you receive him)."

4. Show from his epistles that St. Paul considered the substance of the Gospel neither a dogmatic system nor an ethical code, but a person and a life.

5. The Philippians were distinguished by their firmness of faith under persecution, their constant obedience to St. Paul, and great liberality. Quote passages proving these characteristics.

6. Give briefly a general account of the Catholic epistles.

Senior Pupil Teachers—Fifth and Sixth Years.

Tuesday, December 10, afternoon.

(Time allowed, 2 hours.)

FRENCH.

[N. B.—No French Dictionaries are allowed.]

I. Translate into English the following:

Franklin était ardent et passionné, et personne ne parvint mieux à se rendre maître absolu de lui-même. La première leçon qu'il reçut à cet égard, et qui fit sur lui une impression ineffaçable, lui fut donnée à l'âge de six ans. Un jour de fête, il avait quelque monnaie dans sa poche, et il allait acheter des jouets d'enfants. Sur son chemin, il rencontra un petit garçon qui avait un sifflet, et qui en tirait des sons dont

le bruit le charma. Il offrit tout ce qu'il avait d'argent pour acquérir ce sifflet dont il avait envie. Le marché fut accepté, et dès qu'il en fut devenu le joyeux possesseur, il rentra chez lui en sifflant de manière à étourdir tout le monde dans la maison.

2. Parse the verbs in the above. Give the infinitive, present and past participles, of each.

3. Translate into French:

I have brought you the book which I had promised you. The father, the mother, the children. France is a fine country. Have you seen any sailors? I intend to depart to-morrow. Do you learn to read? One, three, sixteen, twenty-five, eighty-nine.

Senior Pupil Teachers—Sixth Year.

Tuesday, December 10, *forenoon.*

(Time allowed, 2 hours.)

MUSIC.

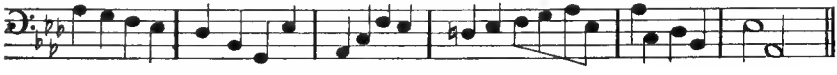
1. Explain the terms modulation, transition, alla breve, alla capella, sforzato.

2. How many kinds of time are commonly used in psalmody?

3. Invent three bars of melody, in any variety of simple time, containing as many *syncopations* as possible.

4. Make a table of the successive signatures, in the order of fifths, of major scales requiring sharps, and of those requiring flats.

5. Transpose the following into the alto stave, and again into the tenor:



6. Give examples, in any key, of the following chords:

8	6	6	6	6
5	3	4	5	4
3				2

PART III.

GUNNERY TRAINING SHIPS AND NAVAL RESERVE.

PART II.

CHAPTER I.

THE GUNNERY TRAINING SHIPS.

The Excellent, at Portsmouth, and Cambridge, at Devonport, are used as ships for training both officers and men in gunnery. The former take here a course in order to qualify as gunnery officers; the latter as seamen-gunners or as trained men. In each case a considerable iucrease of pay accompanies the qualifying certificates.

The Excellent occupies the more important place, as on board of her most of the officers take their gunnery course. The training of the men is the same in each, a fixed course being laid down for general guidance. Moored head and stern with the Excellent, and connected with her by a bridge, is the Calcutta, another line-of-battle ship, and used as a supplementary vessel, the number of men in the Excellent being sometimes very great. There are at present at Portsmouth and Devonport about 1,900 men undergoing this training.

The number under training varies with the exigencies of the service. If the demand for men is great, they stay from three to six months only; otherwise some may stay on board as much as three years. None but good-character men are taken, as time and care cannot be wasted in disciplining unruly persons. The course includes the study of fuses, cartridges, primers, powder, projectiles, and indeed everything connected with the subject of practical gunnery. There is also at Portsmouth one of the new-class gunboats used for firing afloat, and in connection with the numerous torpedo-boats, for torpedo practice.

There is both morning and afternoon drill during every day of the week excepting Saturday and Sunday; on Friday there is a general exercise at quarters. For infantry and musket drill the men are landed on an island near by, used specially for this purpose. The seamen-gunners receive in this last a very careful training, enabling them, as I have before said in speaking of the services done by them in the training ships, to act as drill officers in every capacity.

The facilities for study are very good; models of every article used in the service being in the model-rooms, where the seamen-gunner classes are taught.

A man on foreign service may be rated acting seaman-gunner by passing an examination which by no means covers the ground gone over in the Excellent. He is obliged, in order to receive his full rating, to take the course laid down afterwards. An ordinary seaman cannot be rated able seaman until he has been examined by a gunnery officer and is proved to possess a good knowledge of the various drills.

The rating of seaman-gunner carries an increase of pay per annum: With a first-class certificate, £6 1*s.* 10*d.*; with a second-class certificate, £3 10*s.*; the rating of trained man carries with it £1 10*s.* 5*d.*; so that, apart from the better position obtainable on board ship, there is a considerable money value attached to the higher ratings.

The gunnery training of the man, combined with that received as a boy, turns out a highly-trained class of men, which now includes about half the blue-jacket class of the Navy. There are at present about 3,000 seaman-gunners and 6,000 trained men. Service on board the gunnery ships has a good effect upon the discipline of the service at large: men while there are on their good behavior, the chief punishment of an offender being that he is not kept; and a lengthened term of good conduct, which has been uniformly so for many months, is very likely to continue as a matter of habit.

It is now almost certain that before long barracks will be used instead of these ships, and indeed for all the purposes to which depot and receiving ships are now applied. Of the 18,638 men classed as blue jackets 8,000 are ordinarily in harbor ships, and it is claimed that this is nearly always a period of deterioration which could be changed into one of benefit by having them in barracks ashore. Many claim, too, that the early education given the boy class can be better given ashore than afloat, having, of course, tenders attached to the shore establisments for use in seamanship exercises. There would certainly be great economy in this, as no method of housing men is so expensive as on shipboard. Captain Burney, than whom no man is better able to give an opinion, is very emphatic in his condemnation of ships, and it seems as far as morals, health, and economy are concerned, there is no gainsaying it. There must always be many prejudices in favor of ships, and there are undoubtedly some advantages, but the weight of benefits is considered by many prominent naval men in England to be in favor of houses ashore.

CHAPTER II.

THE NAVAL RESERVE AND ITS TRAINING.

This organization, which binds together to some degree, though not nearly so closely as some would have it, the Royal Navy and the merchant marine, has, at present, a total enrollment of 17,067 men, of whom 11,930 are of the first class. It is generally conceded that in the event of a great war there would be difficulty in manning all the ships necessary, unless there were a force of this kind to draw upon. There has never been, since the reserves were first organized, more than forty years since, a necessity for calling them into active service, so that the men have been in receipt of considerable pay for which actual return has never been rendered.

Great endeavors have been made of late years to render the reserve popular, and the efforts seem to have met with success, many of the men of the fishermen class having been enrolled in late years. These men are particularly valuable as having a fixed residence and being well-trained seamen, as far as mere seamanship goes.

The reserve is divided into first, second, and third classes. In the first class the retainer is £6 per annum; in the second, £2 10*s*., and a suit of uniform clothing; in the third, the suit of uniform only.

The regulations for entry into the reserve are that an applicant must be of good character, and in good health, and must not be above thirty years of age, excepting in the case of men from the Royal Navy who have been discharged with good characters; these may (if able seamen) be received up to thirty-five years of age. An applicant for the first class must prove at least five years' sea service within the preceding ten years, and of these five at least one as able seaman. Every applicant must show that he has been to sea within four months of his application, and must declare his intention of following the sea at least five years longer. If he cannot prove his services, he must satisfy a board of two naval officers of his knowledge of seamanship.

Every applicant for a second-class reserve must show three years' sea service, and of this time at least six months as ordinary seaman.

Men in the coasting trade, or who are in vessels making short voyages, are preferred in these two classes.

The regulations governing the enrollment of the third class are as follows:

The Admiralty grants to the management of every mercantile training ship the sum of £3 for every boy trained therein who joins the third class naval reserve: the conditions being as follows:

1. They must have been two entire years under training in a training ship, and subject to inspection by the Admiralty and board of trade. They must also be under engagement to serve in a merchant ship at sea.

2. They must be sixteen years of age, not less than 5 feet 1 inch in height, and 30 inches around the chest; of robust frame, intelligent, of a sound and healthy constitution, &c.

3. They must be able to read and write, and show satisfactory proficiency in cutlass, small-arm, and gunnery drill, as well as in elementary subjects relating to seamanship and navigation, such as log, lead, compass, rowing, swimming, reefing and furling sails, steering, knotting and splicing, and rule of the road, and must produce a certificate of good character from the captain of the training ship.

They will, on attaining the age of nineteen, provided they have served six months at sea, be eligible to promotion to the second-class reserve, and afterwards to the first class if in all respects qualified.

The service of boys in the third class, who pass from it through the second class into the first, will count at the rate of three years' service for one year's time towards pension, provided they comply with the regulations as to drill and reporting their whereabouts.

These regulations do not apply to boys brought up in reformatory ships.

The number of boys entered under these regulations so far is small, but is increasing. Large numbers of the training ships on the British coast are reformatory, and are thus kept from contributing a quota. Those ships, which have entered into agreement with the Admiralty regarding the naval reserve, are also allowed to enter boys in the naval training ships, a payment of £25 being made to the merchant training ship for each boy so entered. Very few of these boys, however, so enter, on account of being unable to reach the naval standard. That of the naval reserve is less difficult.

LENGTH OF ENROLLMENT.

The enrollment is for five years, and four enrollments must be served in order that a pension may be had. No pension, however, is allowed a man who does not pass from the second into the first class, but half the time served in the second class (in case one does pass into the first), is allowed to count for pension.

The drill to be undergone during the year must be for twenty-eight days. This may (excepting in the first year) be taken in periods of seven days each. There are many stations at which men can assemble for

drill, some of which are shore batteries especially built for the purpose. There are, however, nine ships at various ports whose only use is this. The reserve ships employed in coastguard service are also used as drill ships.

The men of the reserve when assembled for drill are rated and paid as seamen and ordinary seamen of the Navy, and have their traveling expenses paid from and to their homes. They are required during this time to appear in a uniform cap, and in a dark blue suit of clothing; the men and boys of the second and third classes wear the uniform supplied them. The men during this interval are also subjected to naval discipline and law. The drill is one relating to arms only; the forenoon and afternoon are both taken up with pistol, cutlass, musket, and great gun exercise.

There is no doubt that the 17,000 men now enrolled, and who are available under this organization, are a very valuable adjunct to England's Regular Navy; though, scattered, as at least one-third are, over every sea, the whole force could not be quickly brought together. It is for this reason that strong effort is made to draw in the fishing population, hardy and able seamen, who would always be at hand: serving at home or in the coasting trade are 11,940; in the event of war these men can be readily had.

Any one desiring to make a voyage of longer duration than six months must get leave to do so; this leave, however, never extends beyond one year; nor can the man go until he has made, if in his first enlistment, 28 days' drill; if in a second or more, a 14 days' drill.

Among the men of the reserve there are those holding the following certificates and ratings: Masters,* 47; mates, 518; petty officers in merchant service, 3,815. A certain number of midshipmen are admitted to the reserve, who are appointed from those who take honors on board the Worcester and Conway training ships (elsewhere mentioned). There are already 120 of these young men on the Naval reserve list, forming the nucleus of a fine body of officers available in an emergency.

The reserves can only be called out by royal proclamation. Their term of service under this call is only three years, unless war is declared, in which case they may be held two years longer. At the end of five years they can, under any circumstances, demand their discharge.

The estimates for the reserves for the year 1879–'80 were as follows:

Subsistence allowance for officers of the Royal naval reserve while under drill	£1,000
Annual retainer to seamen of reserves	81,000
Drill pay and lodging allowance	38,000
Medical fees for examinations, targets, repairs of arms, &c	1,500
Traveling expenses of officers and men	2,800
Fees to registrars for enrolling men, &c	4,500

* NOTE.—The British merchant ships commanded by officers of the Royal naval reserve, and fulfilling the following conditions, will be allowed to wear a blue ensign. At least ten of the crew must be men belonging to the reserve. Before hoisting the blue ensign the ship must be provided with an admiralty warrant.

Remuneration to officers of coast guard who are in charge of batteries when drilling men	£2,000
Erection and repair of batteries for drilling	7,000
Rent of batteries, carriage of ammunition, &c	100
Pay of pensioner gunnery instructors for mercantile training ships	600
Capitation allowance for boys entered from mercantile training ships	500
Sea pay to officers and crews of drill-ships of the naval reserve	25,526
Victuals for naval reserve	8,229
Victuals for the reserve men when on drill afloat	44,100
Repairs to drill-ships	1,800
Medical attendance, &c	1,528
	220,183

In the future there must be a large addition for pensioners. Some consider this a high price to pay for such service, and regarded in the following light it is:

Comparative cost of fleet and naval reserve men.

The wages of the 30,887 * petty officers, seamen, &c., serving in naval vessels amount to	£1,119,954
Amount required for victualing, supplying gratuitous clothing, &c., to above (about)	650,000
Total cost	1,769,954

Or England could add a permanent force of 3,800 men to her fleet for the money she expends on the 17,000 who may never be called on to do sea duty. Still the money may be regarded as well expended, inasmuch as it disciplines a large number of merchant seamen, whose services are thus made more valuable on board ships where discipline and training are much too often wanting.

* NOTE.—This is the number, exclusive of boys, employed in the Navy proper, and for general service; the coast-guard force are special-service men, whose service is almost altogether ashore. The force employed in Indian troop ships is paid by the Indian Government, and is also excluded. The last amounts to about 1,000 men.

PART IV.

MERCHANT SERVICE TRAINING—ENGLAND.

PART IV.

CHAPTER I.

Intimately connected with the naval interests of the country is the condition of the men who man our merchant ships. With so small a number of seamen allowed in the Navy, we cannot hope to have more than a mere nucleus of a war force; instead of the 60,000 men into which the Navy expanded during the civil war, there are now but 7,500, and in the event of any future contest we must expect our leaven of good men not to exceed one-fourth of the mass we should have thrown on our hands to discipline and train. Under present circumstances we should look in vain to the merchant service for trained seamen.

The question is no less bound up with our commercial and monetary interests; we now see one hundred millions paid yearly to foreign ship-owners for carrying cargoes which, had our shipping interests now their relative importance of twenty years ago, would be carried in American bottoms. Nearly the whole of the North River front of the great port of New York is taken up with a succession of steamers, among which only now and then is the American ensign noted; and when noted is seen to be flying, in almost all cases, over steamers of the coastwise trade. This decadence has, of course, had the effect to diminish immensely the number of men fitted to serve either as masters or seamen; our deep-sea commerce has dwindled to such puny proportions that there is no longer a school for either class. Our tonnage, though the second in the world, is made up mostly of coasters and river steamers,* and when American shipping takes its place once more on the ocean there will be a demand for masters especially, which there is at present no way of supplying.

NOTE.—I desire to acknowledge the very valuable aid afforded me in the preparation of this paper by Thomas Brassey, esq., both through his suggestions and through his writings relating to the navy and merchant marine; by Rear-Admiral Robertson, R. N., Captain Bourchier, of the Exmouth, Captain Smith, of the Worcester, and many others who most kindly gave me the information and assistance necessary to the work.

* In the proportion of 2,686,637 tons employed in river, lake, and coast service to 1,592,821 registered for oversea.

There is now but one merchant training vessel on our whole seaboard—the one forming part of the public-school system of the city of New York, and which is doing most valuable work.

The English, alive to the great interests involved, have established training ships on every part of their coast, though the number of men supplied is still totally inadequate to the demands of their service.

In 1876 the number of men employed in British merchant ships (exclusive of masters) was 198,638; these were distributed as follows:

In home trade	51,225
Part home and part foreign	11,600
Wholly in the foreign trade	135,813
Total	198,638

Of these men 125,811 were in sailing vessels and 72,827 in steamers; 10 per cent. of the former were estimated as stewards, &c., and 50 per cent. of the latter as firemen, coal-heavers, stewards, and servants; leaving a total of the seaman class of about 150,000.

The number of men employed in sailing ships has been steadily decreasing and the number in steamers increasing since 1860. This is not due to any decrease in the number of sailing vessels, but to the fact that fewer men are carried per 100 tons than formerly; the increase in the mechanical appliances in working ship diminishing the number of hands.*

The estimate of the annual waste in this number of men reaches the astonishing number of 16,000. Nearly one-third of this loss arises from death; the deaths in some years reaching as many as 5,000. The remaining loss is occasioned by desertion, giving up the sea, &c. But the fact is that 16,000 men are required yearly to replace those that have disappeared from the English merchant marine, and how to furnish these of a good class is a question which comes home to all thinking Englishmen, closely bound as is the prosperity of their country with that of their shipping interests. That it does receive the attention it deserves is, I think, without question.

A parliamentary report, giving the returns of the training ships employed, was printed in 1875. I give this in full, as it embodies many details which can only be given in such shapes. There are later reports published under the auspices of the board of trade, which are by no means so full, and which differ so slightly that I have not considered it necessary to take them instead.

* See Appendix F.

TRAINING SHIPS

Statement showing the number of boys sent into the merchant service as apprentices, &c.; and several vessels, between September

Name of ship.	Place where established.	Number of boys in ships on September 1, 1874.	For how many the ship is intended.	Nature of ship, according to class of boys educated.			No. of boys sent into the merchant service during 12 months ended Sept. 1, 1874.	
				Reformatory for criminals.	Industr'l school.	Laboring classes generally.	As apprentices.	In other capacities.
Akbar	River Mersey, near Rock Ferry, Birkenhead.	170	200	Reformatory for criminals. No boys received now except under sentence of magistrate.	.....	.....	None. All boys being under detention, are sent to sea on license according to the reformatory act.	28
Clarence*	River Mersey.	229	250	Reformatory	.....	.....	None	57
Chichester	Greenhithe	250	200	.....	.....	Laboring classes.	15	O.S., 2 boys, 211.
Cornwall	Purfleet, Essex.	238	250	Reformatory	.....	.....	Nil	83
Cumberland‡	Row Bay, Garelech, Dumbartonshire, N. B.	349	300 The number is limited to this by the Secretary of State. The ship, however, could easily accommodate 500 boys with a small addition to existing staff.	.....	The ship is certified by the Secretary of State as an industrial school ship under the industrial school act, 1866.	.....	35	91

* Clarence.—The receipts and outlay are those for the year 1873.

‡ Cumberland.—The committee of the Cumberland have, on the whole, had favorable accounts of the any greater proportion than amongst boys of other and the better classes. The boys sent as ordinary sea-tion with owners and masters of ships, and each boy is specially inquired after and reported on for a the period of apprenticeship for boys educated in a training-ship should be shortened to three years. during the last year, and he is thus incited to desert, more especially if he be about 20 years of age.

FOR SEAMEN.

also the place where established, accommodation, class, staff, and working expenses of the 1, 1873, *and August* 31, 1874.

Expenses on board per head per annum as far as known.	Staff employed in management.	Total annual outlay.	Amount received during the year from public vote.	Amount received during the year from private subscriptions, bequests, &c.	Terms of indentures of apprenticeship.	Wages per month of other boys sent to sea.
20*l.* 1*s.* or, deducting industrial profit, 19*l.* 13*s.*	Captain sup't.. Chaplain. Schoolmaster. Ass't schoolmaster. Carpenter. Cook. 6 instructors.	Last year, 3,592*l.*	Treas'y, 2,709*l.* Counties, 503*l.* 3,212*l.*	Private subscriptions, 125*l.*	No apprentices	Average, 30*s.*
About 18*l.* 10*s*..	Captain ..... Chief officers. 10 other officers	About 3,875*l.** ..	3,362*l.* *	391*l.**	No apprentices	
From 16*l.* to 18*l.* a year.	Captain ..... Chief officer. 4 seamen instructors. 1 schoolmaster. 1 ass't schoolmaster. 1 tailor. 1 cook and baker.	5,730*l.* 9*s.* 3*d.*, including outfits for boys on joining ship and on going to sea, and expenses of shipping agents, &c.	Nothing.....	4,537*l.* 15*s.* 3*d.*	10*l.* per annum; time varies according to age of boys. (1*s.* per month for washing; few shillings pocket money.)	According to size, 10*s.* to 15*s.* first voyage.
23*l.* † This is the average of the total expenditure, including repairs, salaries, insurance, taxes, &c.	Captain sup't.. 1 chief officer. 1 chief schoolmaster. 2 ass't schoolmasters. 1 chief carpenter. 1 chief seaman instructor. 4 seamen instructors. 1 carpenter. 1 handmaster. 1 cook. 1 agent in London.	6,264*l.* †	4,588*l.* † Counties or boroughs. 1,699*l.* † 6,287*l.* †	77*l.*	No apprentices	Average, 15*s.* to 25*s.* first voyage.
£ s. d. Cloth'g. 3 8 0 Food ... 7 4 0 10 12 0 Salaries of staff, repairs, and keeping up of ship's boats, &c ... 9 15 10 Being total per head.. 20 7 10	£ s. d. Captain .... 1 Surgeon .... 1 Boatswain .. 1 Naval instructors .. 4 Carpenter .. 1 Blacksmith. 1 Tailor ..... 1 Storekeeper and handmaster .... 1 Schoolmasters (with 9 pupil readers selected from crew). 3 Inspector at Glasgow .. 1 Total ...15	£ s. d. Ordinary. 7,076 8 4 Extraordinary.. 480 15 7 Total 7,557 3 11	From treasury and home office. £ s. d. 5,559 15 6 From rates at Glasgow .. 736 6 7 6,296 2 1	623*l.* 12*s.* 2*d.*	Average 30*l.* for four years— £ 1st year ... 4 2d year .... 6 3d year .... 8 4th year ... 12 30	Average first voyage, 6 stewards and cooks, at 45*s.* 85. O. S., at 25*s.*

† Cornwall.—The figures are the averages for the years 1871, 1872, and 1873.

boys who have been sent to sea. A few of those sent as apprentices have absconded abroad, but not in
men, with few exceptions, are doing well and earning fair wages. The committee are in communica-
period of three years after being discharged from the Cumberland. The committee are of opinion that
A four years' apprenticeship, as now insisted on, makes a lad discontented with his indenture wages

Statement showing the number of boys sent into the

Name of ship.	Place where established.	Number of boys in ships on September 1, 1874.	For how many the ship is intended.	Nature of ship according to class of boys educated.			No. of boys sent into the merchant service during twelve months ended Sept. 1, 1874.	
				Reformatory for criminals.	Industrial school.	Laboring classes generally.	As apprentices.	In other capacities.
Endeavor	Land training brig, Middlesex Industrial School, Feltham, near Hounslow.	149	150	....	Certified industrial school.	.....	4	91
Formidable	Bristol	297	300 to 350 (average, 325).	....	Industrial school.*	.....	52†	3 as O. S.
Gibraltar	Belfast	214	350	....	Industrial school.	.....	3	8
Goliath §	Off Grays Essex, River Thames.	399	500	....	.....	For pauper boys.	76	80
Havannah	Cardiff	84	100 would probably be as many as it would be wise to admit, tho' a larger number might be provided for on board.	....	Industrial school.	.....	3	4
Indefatigable	Mersey, Liverpool.	149	250	....	.....	For sons and orphans of sailors and other poor and destitute boys.	11	23

* FORMIDABLE.—Parents' character at a low ebb. Character best told by sections 14, 15, and 16 of industrial schools act; section 14 chiefly.

† We feel sure that a good one-third of the apprentices have run, but they are still afloat as O. S., and generally are the smartest lads.

We have received, on the whole, most favorable accounts of lads left. The chief and almost only throwback is that of lads not serving out their indentures.

‡ All nautical staff; have been in Royal Navy; schoolmasters certified.

§ GOLIATH.—Besides the boys sent to sea—

56 boys were drafted into the army, as musicians, between September 1, 1873, and above date.
34 boys were claimed by their friends between above dates.
4 boys sent to situations on shore between above dates.
11 boys were returned to their schools; and
3 boys died between above dates.

108, and 156 to sea = 264 total discharged; and 302 boys were admitted between the above dates.

merchant service as apprentices, &c.—Continued.

Expenses on board per head per annum, as far as known.	Staff employed in management.	Total annual outlay.	Amount received during the year from public vote.	Amount received during the year from private subscription, bequests, &c.	Terms of indentures of apprenticeship.	Wages per month of other boys sent to sea.
23*l.* 19*s.* 6½*d.* per head.	3 nautical instructors and 2 schoolmasters for the training brig in particular, and in addition the general administrative staff of the institution.	Proportion chargeable to nautical division: 3,596*l.* 11*s.* 3*d.* (for maintenance and management).	Proportion rec'd on account of of nautical division, 1,396*l.* 5*s.*	Nil.....	40*l.* for 4 years.	Boys, 10*s.* to 15*s.* per mo.; O. S., 20*s.* to 30*s.*
18*l.* 8*s.* 9*d.* July 1, '73, to June 30, 1874.	‡ { Captain superintendent. 1 officer. 4 instructors. Carpenter. Cook. Tailor. Shoemaker. 3 schoolmast'rs Agent. Ship secretary.	5,955.*l*	Home office, 3,648*l* 6*s.* 5*d.*; local school board, 9,950*l.* 0*s*, 10*d.*	1,399*l.* 14*s.* 11*d.*	35*l.* for 3 years.	Boys and O. S., 25*s.* to 35*s.*
		July 1, 1873, to June 30, 1874.				
About 20*l.*	13	.....	1,820*l.* 3*s.* 7*d.* paymaster-general, 910*l.* counties.	591*l.* 8*s.*	.....	
	22, including two officers in brigantine, and 2 officers in charge of hospital on shore.	7,733*l.* 6*s.* 8*d.*	None; expenses paid out of poor rates for Forest Gate school district.	None.....	30*l.* to 45*l.* for 4 years.	10*s.* to 50*s.*
14*l.* 9*s.* 8*d.*...	Hon. secretary.. Hon. treasurer. Hon. medical officer. Superintendent. Boatswain and schoolmaster.	1,322*l.* 6*s.* 2*d.*	Treasury, 976*l.* 1*s.* 3*d.*; school boards, justices, and guardians of the poor, 130*l.* 2*s.* 1*d.*	10*l.* donation; 68*l.* 16*s.* 6*d.* subscriptions; 217*l.* 7*s.* 3*d.* earnings of industrial classes.	35*l.* for 3 years.	Cabin boys, 20*s.*
About 20*l.*‖	Captain..... Chief officer. Carpenter. Cook. 2 schoolmasters. 4 seamen instructors.	Now about 4,000*l.*	Nil.....	About 4,400*l.*	35*l.* for 4 years.	25*s.* to 30*s.*, first voyage; 40*s.* to 50*s.* second voyage.

‖ INDEFATIGABLE.—The average cost per head is calculated over a period of about five years. Early in last year the vessel broke loose from her moorings, and was in dock for eight months. During this period no new boys were admitted, so that the numbers were considerably diminished, and the expenditure increased in consequence of repairs to the ship while in dock.

Statement showing the number of boys sent into the

Name of ship.	Place where established.	No. of boys in ships on September 1, 1874.	For how many the ship is intended.	Nature of ship according to class of boys educated.			No. of boys sent into the merchant service during 12 months ended September 1, 1874.		Expenses on board per head per annum as far as known.
				Reformatory for criminals.	Industrial school.	Laboring classes generally.	As apprentices.	In other capacities.	
Mars	River Tay, about 2 miles up from the Port of Dundee.	305	For 300, but occasionally there are a few more. Could easily accommodate 350 or more.	Nil..	Industrial school.	.....	10	53	19*l.* 14*s.*
Southampton.	Hull	200	240	Nil..	Industrial school.	.....	2 merchant service (6 fishing).	13	16*l.* 3*s.* 9*d.*
Warspite‡..	Woolwich	200	200	Nil..	.....	Laboring classes.	45	163	In 1873, 23*l.* 9*s.*, and 5*l.* 9*s.* clothing, and sea outfit.
Wellesley...	River Tyne	278	300	.....	Industrial school.	.....	None.....	28	Last year, 18*l.* 13*s.* 6*d.*
Total ...	.....	3,511	3,975	3	8	4	Total for 11 ships, 256.	938	.....

*MARS.—The number of boys, *ex* the Mars, who actually go to sea is much greater than is shown here; about three-fourths of those discharged to shore employments come back in order to get ships. We don't encourage apprenticeships for good boys, unless they are taken for a short period on liberal terms. They obtain good wages as ordinarys, in consequence of the practical seamanship they obtain in the Mars sea-going tender. The tender adds considerably to the expense.

G. J., *Secretary to Mars, November* 7, 1874.

‡SOUTHAMPTON.—The usual term of apprenticeship is for four years 40*l.*, with a bonus of 5*l.* at the expiration of the time; 45*l.* for five years, with a similar bonus. There is one instance of 62*l.* for five years, and one of 48*l.* for four years.

The boys seldom remain above one year in their apprenticeship and then desert, the owners and masters taking no trouble to recover them. Apprenticing from an industrial school creates a "final discharge." Boys take advantage of this, volunteer to be apprenticed, and, in some instances, abscond within twenty-four hours after being bound.

Boys not apprenticed receive from 17*s.* 6*d.* to 25*s.* a month as working boys in sailing-vessels, and usually 30*s.* a month as cabin and engineer servants in steamers. The accounts received of boys so sent out are generally satisfactory.

merchant service as apprentices, &c.—Continued.

Staff employed in management.	Total annual outlay.	Amount received during the year from public vote.	Amount received during the year from private subscription, bequests, &c.	Terms of indentures of apprenticeship.	Wages per month of other boys sent to sea.
Captain superintendent. 1 carpenter. 1 chief officer. 1 bandmaster. 1 cook. 1 tailor. 4 instructors. 3 schoolmasters. 1 secretary and treasurer.	1873: 5,915*l.*...	1873: treasury....4,658*l.* County prison b'ds. 300*l.*	859*l.*	35*l.* to 40*e.* for 3 years.	25*s.* to 30*s.*
Captain superintendent. Chief officer. Schoolmaster. Carpenter. Cook. 5 instructors. Bandmaster. 2 female tailors. Shoemaker. Assistant schoolmaster.	4,002*l.* 3*s.* 9*d.*...	3,915*l.* 18*s.* 10*d.*	86*l.* 4*s.* 11*d.*	40*l.* for 4 years and a bonus of 5*l.* at expiration of term.†	17*s.* 6*d.* to 25*s.* in sailing-vessels; 30*s.* cabin and engineer servants in steamers.†
1 superintendent. 1 chief officer. 5 instructors. 2 carpenters. 1 cook. 2 schoolmasters.	In 1873, 6,721*l.*..	None	2,005*l.*, including an unusual anonymous gift of 1,000*l.* Annual subscriptions are very small.	30*l.* to 46*l.* for 4 years for 45 boys‡ Average = 43*l.* 9*s.* for 4 years.	15*s.* to 30*s.*‡
Superintendent ..... Chief officer. 4 sea instructors. 3 schoolmasters. 1 tailor. 1 bootmaker. 1 steward. 1 carpenter.	4,669*l.* 0*s.* 8*d.*...	£ *s.* *d.* Treasury ...3,593 9 4 School b'rds. 614 2 0 Guardians of poor..... 16 2 0 Voluntary boys..... 21 19 6 4,245 12 10	544*l.* 15*s.* 4*d.*	No apprentices now.	O. S., engineers and stewards at 30*s.*
Total for 14 ships, about	70,933*l.* 1*s.* 8*d.*	Total for 11 ships, 51,107*l.* 16*s.* 11*d.*	15,936*l.* 14*s.* 4*d.*	Total for 13 ships.	
Annual average	5,066*l.* 12*s.* 11⅝*d.*	4,646*l.* 3*s.* 4*d.*	1,225*l.* 18*s.* 0*d.*		

‡ WARSPITE.—138 boys were sent into Royal Navy during this period.

Apprentices.	£	
1 boy, 4 years	30	Most of these apprentices were sent to Swansea. The London firms gave the smaller amount.
6 boys, 4 years	35	
3 boys, 4 years	40	
15 boys, 4 years	45	
20 boys, 4 years	46	
—45		

Boys sent to sea signing articles.
2, at 30*s.* per month.
70, at 20*s.* per month.
91, at 15*s.* per month.
—163

It was the exception for apprentices in the coasting trade to serve out their time, and the committee in consequence now send no boys into coasters. Those now in foreign-going ships do much better, but it is a great temptation to an apprentice to run when he sees boys of the same age as himself getting, after one or two voyages, ordinary seamen's pay of 2*l.* or 2*l.* 10*s.* a month. Boys prefer not being apprenticed as a rule.

Very favorable accounts, on the whole, are received of the boys sent to sea on monthly wages; most of them have V. G. on their discharge certificates. When there is much desertion going on, as at present in New Zealand, the boys sometimes go with the seamen, and, like the seamen, engage eventually for the return voyage in another ship. There is always a percentage who, after one voyage, dislike the sea and return to former occupations on shore.

In consequence of the competition among the training-ships in the Thames, it is necessary to employ an agent to solicit boys for the ships.

TRAINING-SHIPS

Statement of the time boys remain in training on board training-ships; also the number ashore from the time the ships were

Name of ship.	Date and year when established.	Time boys remain on board.	Ages of boys.	
			Minimum and maximum age for joining ship.	Minimum and maximum age for leaving ship.
Akbar	1856	Committed for 5 years; remain a little over 3 years.	12 and 16	15 and 19 Depends upon conduct; have power to put out on license after 1½ year's detention.
Clarence	August 15, 1864	3 to 3½ years	11 and 15	None
Chichester	December, 1866	1 year on an average.	13 and 17	14 and 18
Cornwall	June, 1859	Average time about 2 years and 9 months.	11 and 15	According to sentence and admission.
Cumberland	June 30, 1869 This is the date of the ship's certificate from Secretary of State. After that the ship had to be fitted up and boys collected, so that it was about the commencement of 1870 that the institution really was in order and acting.	All boys are committed to the ship until they attain 16 years of age; but so soon as they reach a certain standard in education and in seamanship they are sent to sea. The average time of detention has been about 3 years. It is, however, expected to be less in future.	11 and 14	14 and 16 and upward.
Endeavour	The training-brig was established July 18, 1866 (when the school commenced to train boys for the sea).	Average 2 years and 4 months (including time in other divisions of the school before being placed in the nautical division).	12 and 14 (about)	13 and 16 (about)
Formidable	Certified November 29, 1869 (first boy on board December 1, 1869).	2 to 3 years	11 and 13 years (a few at 10 years).	15½ and 16 years
Gibraltar	June 7, 1872	Until 16 years of age generally.	16 and 14	May be sent out on license any time after they have been on board 18 months; cannot be kept after 16.

FOR SEAMEN.

who have joined the Royal Navy and merchant service, respectively, and the number drafted first established to September 1, 1874.

Number entered in Royal Navy since first establishment.	Number entered in merchant service since first establishment.	Number drafted to other occupations, deaths, &c., since first establishment.	Station on ship.	Remarks.
None..... Royal Navy refuse to take boys direct from a reformatory ship.	635	308	River Mersey, near Rock Ferry, Birkenhead.	
None..... Are not admissible to Navy.	438	43	River Mersey.....	
146	1,217	22	Greenhithe.....	
3	987	233 This includes emigration, discharge to friends, &c.	Off Purfleet, Essex.	
4 Until lately no facilities were afforded for getting the boys into the Royal Navy, and the pecuniary advantages offered in the mercantile marine account for the small number entered in the Royal Navy.	315	123 Of these since being discharged from the ship, about one-fourth have left shore employment and gone to sea in the merchant service. 15 deaths on board and in hospital.	Row Bay, Gareloch, Dumbartonshire.	
88 (46 as band boys.)	642 Up to August 31, 1874.	The number from the Nautical Division would be very small, but very large from the other divisions, besides soldiers, emigrants, &c.	Model training-brig at Middlesex. Industrial school, Feltham.	It is to be explained that the school is established for 800 boys, of whom 150 belong to the nautical section, and are training for the sea on board a model training-brig. Rowing is taught on the River Thames, and swimming in a bath at the school.
15	144	6 emigrated..... 1 Scots Greys' band. 3 situations on shore. 4 transferred to other schools. 4 died. — 18	Off Portishead, Somersetshire.	
	7	4	Belfast.....	

TRAINING-SHIPS FOR

Statement of the time boys remain in training

Name of ship.	Date and year when established.	Time boys remain on board.	Ages of boys.	
			Minimum and maximum age for joining ship.	Minimum and maximum age for leaving ship.
Goliath	November 9, 1870	Depending on their age, size, ability, and capability.	9 and 15½	From 14 to 16
Havannah	A. D. 1861	2, 3, 4, 5, and 6 years	10 and 12	14 and 16
Indefatigable	July, 1865	Average 2½ years	12 and 15	15 and 18
Mars	September 30, 1869	3 to 4 years	Minimum age 12 years, unless very stout; and not admitted at 12 unless healthy growing boys fit for being sailors.	Cannot be detained over 16 years; generally about 16 when discharged.
Southampton	September 24, 1868	Till 16 years of age	11 and 14	14 and 16
Warspite	1756	About 9 months; boys who become fit for Royal Navy do not remain so long.	14 and 16	The boys leave in turn, as soon as a certain course of training has been gone through.
Wellesley	January 17, 1868	Until 16 years of age.	Minimum now 12 years; formerly 10 years.	16
			Total number entered the Royal Navy from 11 ships	
			Ditto Indian Navy	

SEAMEN—Continued.

on board training-ships, &c.—Continued.

Number entered in Royal Navy since first establishment.	Number entered in merchant service since first establishment.	Number drafted to other occupations, deaths, &c., since first establishment.	Station of ship.	Remarks.
26	430	156 into army as musicians. 95 taken by friends. 32 returned to their schools. 16 to situations on shore. 8 deaths. 307	Off Grave, Essex, River Thames.	From date of establishment to September 1, 1874, 1,162 boys were admitted; there being on board on that day 399, it follows that 763 were provided for in manner as described in this return. *W. S. Bourchier*, Captain Superintendent.
5	54	62	Grange Road, Cardiff.	The superintendent is in communication with 34 out of the 59 boys who have gone to sea from the Havannah. No case of desertion has come to his knowledge. *J. Watson*, Hon. Sec. Llandaff, Oct. 23, 1864.
1	369	36	River Mersey, Liverpool.	
12	147	75 to trades. 23 physically unfit for sea. 98	River Tay, near Dundee.	A much larger proportion of the boys would go direct into the Royal Navy if the law allowed them to be detained a year longer. Only a few come up to the standard at 16 years of age. About three-fourths of those sent to trades return, and are fitted out for sea. *G. J.*, Secretary to Mars. Nov. 7. 1874.
None	101	80	Hull	Of the 101 boys sent to sea, 6 are dead and 25 are now working on shore. Of the 80 boys sent to employment on shore, 10 have since gone to sea.
29,389 Royal Navy, 3,760 Indian Navy.	24, 681	None	Woolwich	Warspite belongs to the Marine Society, which originated the training-ship system in the last century. All boys are subjected to a strict medical examination before admission, and engage to serve wherever they may be sent, whether Royal Navy or merchant service.
None	144	66 Very many of these have gone to sea subsequently.	Shields, River Tyne.	When we first began to send boys to sea, 66 were apprenticed; only one of these served his time, having remained the whole time in China. The remainder have mostly done well. We have sent our boys to sea as O. S. at 30*s*., very rarely less; and engineer's stewards at same wages. The boys have, as a whole, turned out remarkably well.
29, 781 3, 760	30, 311	Total number entered merchant service from 15 ships.		

TRAINING-SHIPS FOR OFFICERS.

Name of ship.	Place where established.	Number of boys in ships on September 1, 1874.	For how many the ship is intended.	Number of boys sent into the merchant service during 12 months ended September 1, 1874.		Expenses on board per head per annum as far as known.	Staff employed in management.	Total annual outlay.	Amount received during the year from public vote.	Amount received during the year from private subscription, bequests, &c.
				As apprentices.	On other capacities.					
						£ s. d		£ s. d.		£ s. d.
Conway	Liverpool	103	140	Not as seamen apprentices, but for officers, 46.*	As midshipmen, 6	50 10 0 Pupils fees 50 guineas a year =52 10 0	20	5,755 0 0	None	127 0 0†
Worcester	London	140	140	59	One; withdrawn from ship 11.	57 0 0 (Including uniform and all expenses of staff, &c.) Fees now charged 55 guineas =57 15 0	25	8,000 0 0	None	None

* The pupils of both these ships serve an apprenticeship to become officers only.

† The subscriptions are received to enable members to vote in committee, and are used to educate two or three free boys, sons of merchant captains, deceased.
WORCESTER.—Amount received from boys for fees, £7,953. 17s.

TRAINING-SHIPS FOR OFFICERS.

Statement of the time boys remain on board training-ships; also the number who have joined the Royal Navy and merchant service, respectively, and the number drafted on shore from the time the ships were first established to September 1, 1874.

Name of ship.	Date and year when established.	Time boys remain on board.	Ages of boys.		Number entered in Royal Navy since first establishment.	Number entered in merchant service since first establishment.	Number drafted to other occupations, deaths, &c., since first establishment.	Station of ship.	Remarks.
			Minimum and maximum age for joining ship.	Minimum and maximum age for leaving ship.					
Conway	August, 1859	2 years	13 and 16	15 and 18	As naval cadets, &c., 40	775	Not wishing to go to sea, 162	Liverpool	Intended to bring up gentlemen's sons for officers in the merchant service.
Worcester	August, 1862	2 to 2½ years	12 and 16	15 and 18	5	574	138	Greenhithe, Kent.	23 joined the Royal Naval Reserve as midshipmen.

ANALYSIS OF THE ABOVE TABLES.

Particulars given for the year ending 31st August, 1874.

From the above tables, the columns of which are not, however, complete in all cases, it would appear that at present the gross results attained by these 17 training-ships are as follows:

TABLE I.—*Number of boys sent into the merchant service by each class of ship, and average cost of each boy.*

Class of ship.	Number of each.	Number of boys sent into the merchant service.			Average expense of each boy on board, per head, per annum.
		As apprentices.	In other capacities.	Total number.	
					£ s. d.
For officers	2	105 *	7	112	53 15 0
Industrial schools	8	109	291	400	18 19 7¼
Independent ships	4	147	479	626	21 6 2
Reformatories	3	Nil. †	168	168	20 7 8
Grand total, number of boys sent into the merchant service				1,306	

* These are not seaman apprentices, but officers.
† All boys being under detention are sent to sea on license, under the reformatory act.

TABLE II.—*Expenses of maintenance.*

Class of ship.	No. of each.	Receipts.			Total receipts.	Total expenditure.
		Public vote.	Private subscriptions.	Pupils' fees.		
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
For officers	2	.....	127 0 0	13,492 10 0	13,619 10 0	13,755 0 0
Industrial schools	8	38,246 16 11	4,400 19 1 *	.....	42,647 16 0	33,017 5 9 †
Independent ships	4	.....	10,942 15 3 ‡	.....	10,942 15 3	24,184 15 11
Reformatories	3	12,861 0 0	593 0 0	.....	13,454 0 0	13,731 0 0

* This is the amount received by 7 ships.
† This is the amount received by 3 ships.
‡ This is the amount spent by 7 ships.

TABLE III.—*Accommodation.*

Class of ship.	Number of each.	Number of boys ship is intended to hold.	Number of boys actually on board.	Increased number of boys the ship might accommodate.
For officers	2	280	243	37
Industrial schools	8	2,125 *	1,876	249
Independent ships	4	1,150	998	152
Reformatories	3	700	637	63
Total extra number the ships might accommodate				501

* On referring to the remarks set against the Cumberland, Havannah, and Mars, it will be seen that these ships might be made available for a further increased number.

The Arethusa, Clio, Mount Edgecumbe, and Shaftesbury have lately been added to this list; the last named within the past year; the Goliath, burned in 1875, has been replaced by the Exmouth.

The Arethusa is under the same society as the Chichester, and is moored at the same point in the Thames; the Clio and Mount Edgecumbe are industrial school ships such as the Formidable.

The Shaftesbury, the most important of these new additions, was purchased by the London school board from the Peninsular and Oriental Steamship Company, and fitted for her present uses at an expense of £42,000; there is attached to her as a tender a small bark intended for practical exercises under way. This school has been so lately organized that no judgment can be formed as yet of its effectiveness.

I visited as many of these ships as was possible during my stay in England, and saw the workings of a sample ship of each class. Three of this list are wholly for convicted boys; all, with the exception of the Warspite, Indefatigable, and Shaftesbury, are for none but the poorest classes, and can be regarded as having been primarily established not so much for the benefit of the mercantile marine as for affording an outlet and employment to some of the great pauper class which forms so large a percentage of Great Britain's population. A great number are thus put in a fair way to become useful men, who would otherwise almost inevitably drift into crime and degradation.

CHAPTER II.

First, in point of age at least, is the society under whose charge is the Warspite. This society, founded by Jonas Hanway, was incorporated in 1772; since that time 58,600 boys have been sent into the royal and mercantile navies by this one institution.

The boys admitted to the ship must be between thirteen and sixteen years of age, and from the following classes:

1st. Boys who are destitute and without friends.

2d. Boys who are in abject distress who are recommended by officers of the society.

3d. Boys who have been apprentices, charged with petty offenses, and who are found unfit for apprenticeship.

4th. Boys desirous of going to sea and whose parents are unable to support them.

Boys under fourteen must be 4 feet 9 inches in height; those over fourteen must 4 feet 10 inches.

The society is made up of most influential men, and holds a high rank amongst the beneficiary societies of England; it is entirely supported by voluntary contributions. The list of annual subscribers is very large, being nearly 500 in number. The subscriptions of last year amounted altogether to £12,421 sterling; of this there was expended in the year £9,737. These expenses were divided as follows, the number of boys on board being about 300:

	£	s.	d.	£	s.	d.
Clothing and bedding for boys and officers, including outfit for 153 boys sent to sea during the year	1,619	17	7			
Victualing officers and boys on board	3,604	7	0			
Repairs and stores for ship and boats, wood, iron, painting, blacksmith, and plumber	495	10	7			
Cordage and canvas	104	17	3			
Oil, candles, lamps, soap, &c., at ship	180	0	6			
Various small stores and expenses at ship, school fittings and books, fares of officers and boys, &c	200	18	7			
Coals at ship	58	17	9			
Salaries to superintendent, chaplain, surgeon, and officer at ship	1,274	3	0			
Rewards, medals, and swimming prizes	63	2	6			
Seamen's hospital	21	0	0			
Rent and repairs at establishment on shore at Charlton, swimming-bath, water for ship, erecting drying-closet, &c	350	18	7			
Insurance of ship	17	1	9			
Total expenditure for ship				7,930	15	1
Completion of fitting up Warspite, remooring, &c				409	2	4

		£	s.	d.	£	s.	d.
Shipping-agency expenses		151	6	11			
Rent, £1,000; rates, £122 10*s.* 3*d.*; repairs, £10 16*s.*; insurance, £10 16*s.* 9*d.*	1,144 3 0						
Less rent from undertenants	932 3 6						
		211	19	6			
Salaries to secretary, clerk, and messenger		562	8	0			
Examining surgeon		52	10	0			
Pensions		116	10	0			
Coals at office		9	13	0			
Books, printing, stationery, and postage, special appeals, &c.		130	13	11			
Advertisements		74	1	6			
Incidental expenses		27	18	4			
					1,337	1	2

Making a total of £9,736, 18*s.* 7*d.*, or an averge of £32 per boy.

The following list of clothing is supplied to each boy on admission, and a sea outfit is given him when he leaves the ship for sea service:

Two blue serge frocks.
Two pairs blue cloth trousers.
Two flannel waistcoats.
Two striped cotton shirts.
Two pairs blue worsted socks.
Two pairs boots.
One black alpaca tie.
One blue cloth cap.
One blue comforter.
One pair mittens.
One drill frock.
One canvas bag.
Bed, pillow, blanket, and coverlet.
Hammock, with clews and lashings.
Pannikin, spoon, and towel.
Comb and small bag, with sewing materials, &c.

SEA OUTFIT.

One jacket, one pair trousers.
One southwester, one pair socks.
Bible and prayer-book, knife.

The boys are kept for no definite time, but usually they stay on board for two years. During this time they receive an elementary English schooling, and are taught seamanship as far as it can be taught under the conditions in which they are placed.

The ship is an old line-of-battle ship, with plenty of accomodations for the number on board. She is moored near the shore, immediately above the Woolwich dock-yard, and communication is kept up with the shore by the ship's boats, manned by boys.

Last year there were sent afloat 153 boys. Some few of these boys are able to reach the naval standard, and enter the naval training-ships; but nearly all have positions found for them in the merchant service, the society having an agent who looks after this. The training and discipline on board the Warspite appear to be good; the few boys received into the naval training-ships are always well spoken of by the officers. The clothing and food are good and plentiful, and the physique on board is above that shown in most of the other training-ships.

The Arethusa and Chichester, two large frigates, receive the waifs of the London streets, taking boys of extreme youth, who are cared for as in a reformatory. These ships are but a branch of the great society of

which the Earl of Shaftesbury is the head, and under the care of which are many hundreds of children of both sexes. At the time of my visit there were about 200 boys in each vessel. Both ships are moored in the Thames, off Greenhithe, about 20 miles below London. The routine on board is divided between school instruction, of an elementary kind, and seamanship exercises.

The Formidable, off Portishead, near Bristol, may be taken as an example of the ships under the industrial schools act, under which large grants are made by the government for the support of such schools. In this especial case there are also yearly grants made by the various towns which are allowed to send boys to the ship.

REGULATIONS FOR ADMISSION TO FORMIDABLE.

REGULATIONS FOR THE ADMISSION OF BOYS.

Boys between the ages of eleven and fourteen will be received on board the Formidable, if sent by magistrates with a medical certificate of fitness for a sailor's life, and approved by the committee under the following sections of the industrial schools act:

CLAUSE 14. Any person may bring before two justices or a magistrate any child, apparently under the age of fourteen years, that comes within any of the following descriptions, namely:

That is found begging or receiving alms (whether actually or under the pretext of selling or offering for sale any thing), or being in any street or public place, for the purpose of so begging or receiving alms.

That is found wandering and not having any home or settled place of abode, or proper guardianship, or visible means of subsistence.

That is found destitute, either being an orphan or having a surviving parent who is undergoing penal servitude or imprisonment.

That frequents the company of reputed thieves.

The justices or magistrates before whom a child is brought as coming within one of those descriptions, if satisfied on inquiry of that fact, and that it is expedient to deal with him under this act, may order him to be sent to a certified industrial school.

CLAUSE 15. Where a child, apparently under the age of twelve years, is charged before two justices or a magistrate with an offense punishable by imprisonment or a less punishment, but has not been in *England* convicted of felony, or in *Scotland* of theft, and the child ought, in the opinion of the justices or magistrate (regard being had to his age and to the circumstances of the case), to be dealt with under this act, the justices or magistrate may order him to be sent to a certified industrial school.

In the case of boys who do not come under one of these clauses, and therefore cannot be sent by a magistrate's order, they will be received into the school, provided those persons who are interested in them are willing to contribute £18 per annum for each boy; and provided also that the boy be physically fitted for a sailor's life, and is willing to be bound to remain at the school a certain period and go to sea when a ship is selected for him. He must also be apparently between eleven and fourteen years of age, and must be approved by the committee and the medical officer.

The total amount expended last year, there being on board an average of 300 boys, was £7,637. During the year, 118 were passed through

the ship, only 52 of whom, however, went to sea. I append the dietary and routine of this ship, as she is considered a very good one of her class.

BREAKFAST AND SUPPER.

½ oz. cocoa and ¼ oz. sugar each time; bread, 7 oz. for breakfast, and 10 oz. for supper.

DINNERS.

Sunday.—Beef-steak pie; 5 oz. fresh meat; 6 oz. flour; 8 oz. potatoes; ¼ oz. suet; 4 oz. bread.

Monday.—Boiled beef or pork, with pea soup and pudding; 6 oz. salt meat; 6 oz. split peas; 7 oz. bread.

Tuesday.—Preserved-meat stew; 2 oz. preserved meat; 12 oz. potatoes; 4 oz. vegetables; 1½ oz. rice; 4 oz. bread.

Wednesday and Friday.—Fresh-meat stew; 4 oz. fresh meat; 4 oz. vegetables; 1½ oz. rice; 6 oz. bread.

Thursday.—Cold meat, with plumb pudding; 4 oz. preserved meat; 6 oz. flour; ¼ oz. suet; 1 oz. currants; 4 oz. bread.

Saturday.—Preserved-meat stew, with plumb pudding; 2 oz. preserved meat; 4 oz. vegetables; 4 oz. flour; ¼ oz. suet; 1 oz. raisins; 4 oz. bread.

Petty officers and monitors get butter daily.

Sunday "tea allowance" of bread, 10 oz. each boy, contains currants, carraway seeds, and sugar.

ROUTINE OF EXERCISES.

	SUMMER.	WINTER.
Sail drill	Every Tues. (summer only.)	
Scrub hammocks	P. M. 1st Tuesday in mo	P. M. 1st Tues. in 2d mo.
Mend and wash clothes	Every Wednesday	Every Wednesday.
Air bedding	A. M. every Thursday	A. M. every Thursday.
Bath for each boy	A. M. Tues. and P. M. Sat	A. M. Tues. and P. M. Sat.
Wash upper deck and poop	Tues., Thurs., and Sat	A. M. Saturday.
Wash main-deck	Mon., Wed., Fri., and Sat	P. M. Wed. and A. M. Sat.
Wash lower deck	Daily	Messes daily. Whole deck, Saturday, A. M.
Wash orlop-deck and platforms and lower storerooms.	A. M. Wednesday	A. M. Wednesday.
Wash boats and gear Stations for extin. fire	A. M. Saturday	A. M. Saturday.
Land, for recreation, ordinarily.	P. M. Saturday	P. M. Saturday.
Life-boat practice	1st Saturday in mo	1st Saturday in mo.

Swimming exercise, during summer, as tide and weather permit, and Monday, Tuesday, Thursday, and Friday, in bath, when practicable.

Band practice, under master ..... Daily.

The daily routine includes school from 9 to 11.55 a. m., and from 1 to 4 p. m., and night school for backward boys on Monday, Tuesday, Thursday, and Friday.

CHAPTER III.

THE EXMOUTH.

The Exmouth is a school for poor boys, the charge of which is borne by the metropolitan parishes and unions. This ship has taken the place of the Goliath, which was burned December 22, 1875, at which time there was such an evidence of heroism and discipline on the part of the boys on board as to excite general remark and praise throughout England. Of all the ships of the kind I visited, this appeared to me to be by far the most satisfactory and successful.

The ship is a three-decker, moored in the Thames, off Gray's, some forty miles below London. She lies immediately off some grounds containing about seven acres, which are rented by the committee of management and which form a useful adjunct in maintaining the health and comfort of the boys. A large dwelling-house, used partly as a hospital, partly as a receptacle for newly-entered boys, where they remain a week before transfer to the ship; fine trees, a large kitchen-garden, and a lawn, in which gymnastic apparatus is erected, are amongst the advantages of this place: it is a great factor in making the ship so successful. A causeway leads from these grounds towards the ship, making the distance to pull from shore a very short one.

DESCRIPTION OF THE INTERIOR ARRANGEMENTS.

The ship is one of the finest of the old liners and is in excellent condition. She retains all her spars, has a large number of boats, and is fitted inside with respect to convenience and comfort only, no effort being made to retain much of the interior appearance of a man-of-war. The forecastle has been roofed over as a washroom; forward, on the main deck, are rooms for the tailors and shoemakers; below are arranged drying rooms heated by steam for the boy's clothing, and the space formerly occupied by the machinery is now used as a practice room for the band, and as a reading and lecture room. The arrangements of the washroom are especially excellent. Here all the boys are required to have a thorough scrubbing all over daily, with water and carbolic soap. For this purpose there are numerous small troughs, which are large enough for a boy to sit down in; after this scrubbing, each boy is required to take a plunge in a large tank of water (15 feet square and 4 feet deep), ropes being stretched on either side, which require him to dive the width of the tank. For the morning's wash each boy is supplied with a clean towel daily, a most wise regulation, as the transmission of infectious skin diseases so common amongst boys of this class is thereby almost com-

pletely avoided: all towels after being once used are thrown into baskets, whence they are taken and washed in a washing-machine and dried in the drying room. The head is also arranged on the spar deck, being built well out beyond the ship's bows, the passages leading to it, as well as the head itself, being well covered and protected. No arrangements on board ship could well be more perfect, and the benefit is shown in the remarkably healthy appearance of the boys, which is the more marked as they come, as a rule, from an underfed and unhealthy part of the population.

The staff of the ship is as follows:

Office.	Minimum salary.	Rate of annual increase.	Maximum salary.	Other emoluments.
	£ s. d.	£ s. d.	£ s. d.	
Captain-superintendent	400 0 0	.....	.....	Unfurnished apartments, coals, and lights, and an allowance of £30 per annum in lieu of rations.
Chief officer	100 0 0	5 0 0	120 0 0	Board, lodging, washing, and uniform.
Medical officer	140 0 0	.....	.....	Nil.
Chaplain	100 0 0	.....	.....	Nil.
Steward	85 0 0	5 0 0	105 0 0	Board, lodging, and washing.
Head schoolmaster	120 0 0	5 0 0	150 0 0	Board, lodging, washing, and uniform.
1 assistant schoolmaster	50 0 0	5 0 0	70 0 0	Do.
2 assistant schoolmasters	40 0 0	2 10 0	50 0 0	Do.
1 assistant schoolmaster	35 0 0	1 0 0	40 0 0	Do.
Chief seaman instructor	50 0 0	2 0 0	60 0 0	Do.
4 seamen instructors	40 0 0	2 0 0	50 0 0	Do.
Master carpenter	70 0 0	5 0 0	90 0 0	Do.
Carpenter's mate	45 0 0	2 0 0	55 0 0	Do.
Master tailor	50 0 0	2 0 0	60 0 0	Do.
Master-at-arms	40 0 0	2 0 0	50 0 0	
Cook	45 0 0	1 0 0	50 0 0	Do.
Messman	30 0 0	2 0 0	40 0 0	Do.
3 night watchmen	40 0 0	.....	.....	Do.
Bandmaster	60 0 0	2 0 0	70 0 0	Do.
Steward's assistant, 12*s.* 6*d.* per week.	.....	.....	.....	Do.
Master of tender	120 0 0	5 0 0	150 0 0	Do.
Mate of tender	40 0 0	2 0 0	50 0 0	Do.
Attendant in charge of infirmary on shore.	45 0 0	1 0 0	50 0 0	Do.
Gardener for infirmary on shore	52 0 0	.....	.....	Nil.
HOME AT LIMEHOUSE.				
Shipping officer	50 0 0	.....	.....	Board, lodging, washing, and uniform.
Wife of shipping officer	18 0 0	.....	.....	Do.

The boys, as before stated, are all of the poorest class, and are sent by the boards of the unions (almshouses) of the metropolitan districts of London; they are received at any time between the ages of nine and fifteen and a half, and are obliged to leave when they arrive at the age of sixteen or sixteen and a half; the largest number are received on board between twelve and thirteen. They receive instruction in the elementary English branches, in seamanship, swimming, small-arm, cutlass, and great-gun drill, and in singing. All boys are taught to cut, make, and mend their own clothing. A band with a complement of fifty-eight is kept up, and certain boys are given instruction in carpentering and in cooking; the latter especially is a most excellent idea.

Attached to the ship is a small brigantine, which is used for practical training underway. She cruises in the mouth of the Thames between April and October; the complement of boys on board is thirty, ten being changed every week, so that they are always twenty oldsters to ten new hands. The more important instructions on board this tender are: keeping careful watch by night when at anchor; mooring and unmooring; loosing and making sail, and reefing and furling under all conditions; steering; a thorough knowledge of conning terms; heaving-to and picking up boats; heaving the log and lead; handling anchors; practical teaching of the rule of the road in a crowded river.

The leading boys are required to take charge of the deck. Practice such as this in a crowded estuary, like that of the Thames, is most valuable; nowhere else could the rule of the road be more thoroughly learned; collisions would be much less frequent if such training were general to ship's companies.

During the winter months the master of the brigantine is employed in teaching a class in elementary navigation, in which instruction is included the use of decimal fractions and logarithms, a knowledge of the coasts and lights of the English Channel, &c.

Swimming is practiced in a large tank moored near the ship, similar to those used for the naval training-ships This tank is 60 feet long, 30 broad, 7½ feet deep at one end, and 4½ at the other. All boys are required to learn to swim.

DIVISIONS FOR INSTRUCTION—ROUTINES.

The whole ship's company is divided into five classes, numbering about 120 each. These classes run through all instructions, whether school or practical. Each class is in charge of a seaman instructor, who is responsible for the general good appearance of his class.

The general routine is as follows:

DAILY ROUTINE.

A. M.

5.45—Reveille—Lash-up and stow hammocks. Prayers.

6.00—Clean main deck by divisions. Wash and bathe by divisions.

6.50—Captains and cooks of messes—7.05 *on Sundays.*

7.00—Breakfast—7.15 *on Sundays.*

7.20 { Boat for officers and letters.
Watch below clean mess decks. Mess traps.
Watch on deck clean upper and orlop decks. Lower boats.

8.00—Officers breakfast.

Haul taut and coil down ropes. Clean paint work, brass work, bits. Put decks to rights. Clean boats.

8.20—Band call.

8.30—Assembly. Letter boat. Inspection of boys by divisional officers.

8.45—Inspection of decks, &c., by captain-superintendent.

9.00—Prayers. Seamanship instructions. Drills. School. Working parties and boat's crew told off.

10.30—Change drills. Retreat for ten minutes. Open all ports. Doctor's boat.

11.00—Letter boat.

12.00—Clear up decks. Retreat. Open all ports.

P. M.

12.10—Captains and cooks of messes prepare dinner—12.30 *on Sundays.*

12.30—Dinner—12.50 *on Sundays.*

12.50—Cooks of messes wash up and sweep out messes, and clear up mess deck. Open all lower deck ports.

1.55—Assembly.

2.00—Seamanship instructions. Drills. School. Working parties.

3.00—Letter boat.

3.20—Change drills. Retreat for five minutes. Open all ports.

4.30—Clear up decks. Fill plunge-bath in lavatory. 4.00 p. m. on Fridays in winter.

4.50—Captains and cooks of messes.

5.00—Supper.

5.20—Cooks of messes wash up. Letter boat. Fill up all tanks and cisterns. Open lower deck ports.

6.00—Assembly. School watch to school or singing; working watch to seamanship; on Monday, Tuesday, Thursday, and Friday; and on Wednesday and Saturday the band plays for boys to dance.

6.44—Clear up decks. 6.45 retreat. Open all ports.

7.35—Clear decks. Open all ports. Take in spare lamps.

7.50—Assembly on orlop deck, to stand by hammocks. { Sound one G, get up main deck hammocks. Sound two G's, get up lower deck hammocks. Sound three G's, get up orlop deck hammocks. }

8.00—Bed call. Prayers. Turn in. Rounds.

10.00—Officers' lights out.

The following is the school time-table:

Metropolitan-training ship Exmouth—School time-table.

ORDINARY SCHOOL CLASSES, DAILY.

TIME.		FIRST.	SECOND.	THIRD.	FOURTH.	FIFTH.
			SCRIPTURE.			
A. M.	9.00 to 9.45	Attendance registers to be	marked by schoolmasters.			
	9.45 to 10.00	Reading.	Arithmetic.	Reading.	Arithmetic.	Reading.
	10.00 to 10.35	Arithmetic.	Reading.	Arithmetic.	Reading.	Arithmetic.
	10.35 to 11.15		Writing in copy book	or transcription.		
	11.15 to 12.00					
P. M.	2.00 to 2.15	Attendance registers to be	marked by schoolmasters.			
	2.15 to 2.45	M. W. F. Geography. T. Th. History.	Dictation.	M. W. F. Geography. T. Th. History.	Dictation.	M. W. F. T. Th. Object lessons. Transcription.
	2.45 to 3.30	Dictation.	M. W. F. Geography. T. Th. History.	Dictation.	M. W. F. T. Th. Object lessons. Tables.	Arithmetic.
	3.30 to 4.00	Reading.	Arithmetic.	Reading.	Arithmetic.	Reading. Tables. or singing.
	4.00 to 4.30	Arithmetic.	Reading.	Arithmetic.	Reading.	

General drill on Wednesday afternoon.—On Saturday, inspection and mending clothes in morning, and half-holiday in afternoon.

SEAMANSHIP CLASSES.

Days.	Classes.	9 to 10.	10 to 11.	11 to 12.	2 to 3.30.	3.30 to 4.30.
		Pages.	*Pages.*	*Pages.*	*Pages.*	*Pages.*
Monday	1	Sail instruction..... 158–177	Seizings, lashings, whippings..... 121–126	Compass instruction. 190–209	Seizings, lashings, whippings..... 121–126	Compass instruction..... 190–209
	2	Sail instruction..... 158–177	Lead-line instruction 209–212	Boat instruction..... 177–184	Compass instruction..... 190–209	Seizings, lashings, whippings..... 121–126
	3	Sail instruction..... 158–177	Compass instruction. 190–209	4th instruction..... 51–121	3d instruction..... 35– 51	4th instruction..... 51– 91
	4	Sail instruction..... 147–158	Boat instruction..... 177–180	Signal, flags, and color system..... 15– 25	2d instruction..... 13– 20	Compass instruction..... 190–209
	5	Sail instruction..... 147–158	Boat instruction..... 177–180	Compass instruction. 190–209	Sail instruction.... 147–162	Fittings of ship, parts of capstan, anchor, and chain cable..... 230–252

Tuesday	1	Washing clothes.	Rope, the different sorts, how distinguished and made.. 126–130	4th instruction..... 92–121	3d instruction..... 21– 35	Sailmaking instruction..... 129–134	
	2		Sails, and how fitted.. 134–146	4th instruction 51– 91	Sailmaking instruction..... 129–134	3d instruction..... 21– 35	
	3		Blocks and purchases 216–230	3d instruction 35– 51	3d instruction..... 35– 51	Compass instruction..... 190–209	
	4		Compass instructions. 109–209	2d instruction..... 13– 20	2d instruction..... 13– 20	Flags, lead line instruction 209–212	
	5		Fittings of ship, parts of capstan, anchor, and chain cable.... 230–252	1st instruction..... 1– 12	Compass instruction..... 190–209	1st instruction..... 1– 12	
Wednesday		9 to 11		11 to 12.	2 to 4.30.		
		Boat drill or seamanship.		Hammock drill or seamanship.	Fire quarters, general drill.	March out, according to weather.	
Thursday	1	Sail instruction..... 158–177	Seizings, lashings, whippings.... 121–126	Compass instruction. 190–209	Seizings, lashings, whippings 121–126	Compass instruction..... 190–209	
	2	Sail instruction..... 158–177	Lead-line instruction. 209–212	Boat instruction..... 177–184	Compass instruction..... 190–209	Seizings, lashings, whippings..... 121–126	
	3	Sail instruction..... 158–177	Compass instruction. 190–209	4th instruction..... 51–121	3d instruction..... 35– 51	4th instruction..... 51– 91	
	4	Sail instruction..... 147–162	Boat instruction..... 177–180	Signal, flags, and color system 15– 25	2d instruction..... 13– 20	Compass instruction..... 190–209	
	5	Sail instruction..... 147–158	Boat instruction..... 177–180	Compass instruction. 190–209	Sail instruction 147–162	Fittings of ship, parts of capstan, anchor, and chain cable 230–252	
Friday	1	Sail instruction 147–158	Rope, different sorts, how distinguished and made..... 126–130	Chaplain's instructions	3d instruction..... 21– 35	Sailmaking instruction..... 129–134	
	2	Rope, different sorts, how distinguished and made 126–130	Sails, and how fitted. 134–146	Chaplain's instructions	Sailmaking instruction..... 129–134	3d instruction 21– 35	
	3	Compass instruction. 190–209	Blocks and purchases. 216–230	Chaplain's instructions	3d instruction..... 35– 51	Compass instruction..... 190–209	
	4	2d instruction..... 14– 20	Compass instruction. 190–209	Chaplain's instructions	2d instruction..... 13– 20	Flags, lead-line instruction 209–212	
	5	Signal flags and color system..... 15– 25	Fittings of ship, parts of capstan, anchor, and chain cable.... 230–252	Chaplain's instructions	Compass instruction..... 190–209	1st instruction..... 1– 12	

The pages in seamanship lessons refer to Captain Burney's Boys' Manual of Seamanship, &c., for the use of training-ships. Registers of attendance to be marked by the instructors within 15 minutes after the commencement of the morning and afternoon classes. Boys on brigantine to receive instruction in lessons similar to the above.

Metropolitan-training ship Exmouth—School time-table—Continued.

INSTRUMENTAL MUSIC CLASSES.

Day.	Morning—9 to 12.	Afternoon—2 to 4.30.	Evening—6 to 6.45.
Monday	Brass and reed band.	2d class or elementary band: Violin and bugle learners of watch to practice.	String band.
Tuesday	String band.	2d class or elementary band: Violin and bugle learners of watch to practice.	
Wednesday	String band.	General drill	
Thursday	Brass and reed band.	2d class or elementary band: Violin and bugle learners of watch to practice.	
Friday	Drum and fife band. Bugle learners of watch to practice.	2.0 to 4.0. String band.	

Register of attendance to be marked by the bandmaster within 15 minutes after the commencement of the morning and afternoon classes.

GUNNERY CLASSES.

Day.	9 to 10—Novices.	10 to 11—2d class.	11 to 12—1st class.	2 to 3.30—1st class.	3.30 to 4.30—2d class.
Monday	Rifle and bayonet.	Single stick.	Gunnery.	Rifle and bayonet.	Single stick.
Tuesday	Washing clothes.	Cutlass exercise.	Gunnery.	Cutlass exercise.	Rifle and bayonet.
Wednesday	Rifle and bayonet.	Single stick.	Gunnery.	General	drill.
Thursday	Rifle and bayonet.	Single stick.	Gunnery.	Rifle and bayonet.	Single stick.
Friday	Rifle and bayonet.	Cutlass exercise.	Chaplain's instructions.	Cutlass exercise.	Rifle and bayonet.
Saturday	Clean great guns	and small-arms.		Half	holiday.

Boys who have not passed the 4th standard to be at school and seamanship, &c., in alternate watches, viz, starboard and port. Boys who have passed the 4th standard to attend school for 3 hours on Friday forenoon, during which time all the boys on the "ordinary school classes" registers are to attend the seamanship and other classes for 2 hours and chaplain's instruction for an hour. Boys who have passed the 4th standard to attend chaplain's instructions from 3 to 4 p. m. on Fridays.

The following marks are to be used in filling up the registers, viz, / School forenoon, \ School afternoon, **B** Away on duty in brigantine, **C** Carpenter's crew, **D** Special duty, such as shoemakers, steerage, officers, mess-boys, messengers, &c., **G** Galley boy, **L** Leave, **Q** Quartermaster, **S** Sick, **T** Tailor, **M** Music.

During the winter all classes to close at 4.0 p. m.

Submitted to and approved by the board of management on the 16th day of November, 1878.

WM. BREWER, *Chairman.*

The qualifications for passing from class to class, as given in the regulations, are as follows:

IN SCHOOL.

To pass from fifth into fourth class.—You must be able to *spell* words of one syllable. *Write* a line on your slate from a copy. Do simple addition and subtraction *sums*, of not less than four figures, and know the *multiplication table* as far as "6 times 12."

To pass from fourth into third class.—You must be able to *read* a short paragraph from a book not confined to words of one syllable. To *write* a line of print on your slates or in copy-books; to *write* a few common words from *dictation*. Do simple addition and subtraction *sums*, and know the multiplication table to "6 times 12." Standard I.

To pass from third into second class.—You must *read* with intelligence a short paragraph from your reading-book. *Write* a sentence from the same book, slowly read once, and then dictated. *Copy-books* are to be shown. *Work the four simple rules in arithmetic* as far as short division. Point out the nouns in *grammar*, and answer easy questions in *geography*. Standard II.

To pass from second into first class.—You must *read* with intelligence a short paragraph from your reader. *Write* a sentence from the same book, slowly dictated once. Show *copy-books*. Work simple long division and compound addition and subtraction (money sums). Point out *nouns, verbs, and adjectives*. Answer questions upon the *map of England*, and the county of *Essex*. Standard III.

To pass out of school.—You must *read* with intelligence a few lines of *prose or poetry*. Write eight lines of *dictation* from your reading-book. Show *copy-books* (small hand). Work all *compound rules in arithmetic*, together with *reduction* (weights and measures). *Parse* a simple sentence. Answer questions upon the *geography* of Great Britain, Ireland, and the colonies; and also in *English history*. Standard IV.

IN SEAMANSHIP.

To pass from fifth into fourth class.—Must have a slight knowledge of names of spars and rigging, boat-duty, making clothes stops, washing and mending clothes, compass, lead and line, hammock drill, coiling ropes, bends, and hitches, and general information.

To pass from fourth into third class.—A good knowledge of the above, and of knots and splices, models, sail drill, and names of the international code signal flags.

To pass from third into second class.—A good knowledge of the above; also of anchor and cask, to make grummets and cringles, to point and whip a rope, loosing and furling sails, sending top-gallant masts and yards up and down, and reefing topsails.

To pass from second to first class.—A good knowledge of all the above, and to know how to make a reef point and gaskets; to worm, parcel, and serve a rope; to strap a block, to put on a seizing, and turn in a dead-eye.

Boys in first class, in addition to all the above, will be required to know—setting up rigging, use of palm and needle, to sew a seam, to work eyelet holes, to work cringles, making mats, rule of the road at sea, use of the long line, steering by compass and sails; sail a ship, as applied to the brigantine; sail a boat; bend and unbend sails; and some knowledge of gunnery instruction.

Boys who can pass this examination will be placed on a list as "Fit for sea."

THE BAND.

The band numbers 58 in all; 43 being in the first class. They are uniformed as bandsmen in the navy; are taught by an efficient musician, and all read music fairly; they play remarkably well for such young persons. It is said that the boys of the band, though so much of their time is taken up with music, advance more rapidly in other things than most of the other boys; some of the best seamanship lads are amongst them. Those who wish finally to go as musicians have places found

for them in the regimental or naval bands. In any case they have a good and paying profession to fall back upon.

On Wednesdays and Saturdays the band plays for dancing in the evenings.

CARPENTERING.

Those boys who are found to have a taste for carpenters' work are taught the use of tools; these same boys are found useful in assisting with the pumps at fire quarters. In this connection I would mention a very valuable use of the plunge-bath on the forecastle for putting out fires. The tank, holding twelve tons of water, is filled every afternoon at 4.30; a hose is coupled onto the exit pipe long enough to reach any part of the ship, and there is thus a large body of water which, from its situation above any point where a fire is likely to occur, has a strong head ready for instant use.

TAILORING.

Each boy on going on board has to go to the tailor's shop during his watch off until he is passed by the master tailor as fit to put a patch on, and otherwise able to repair his own clothing; later on he is instructed in cutting out and making his clothes.

GYMNASTICS AND CALISTHENICS.

These exercises which I saw were very excellent; the whole 600 boys went through their movements on the spar deck, seemingly moving as with one impulse. They afford a capital setting up, besides being an important element in discipline. Most of the movements were carried on by bugle calls, which are here used to an extent that I had not seen before, forty-one being in constant use, as follows:

1. Réveille.
2. Cooks of messes.
3. Assembly by divisions.
4. Assembly by companies.
5. Officers' mess call.
6. School watch call.
7. Working watch call.
8. Band call.
9. Singers' call.
10. Petty officers' call.
11. Starboard watch call.
12. Port watch call.
13. Silence, or still.
14. Go on.
15. Brigantine's crew call.
16. Clear up decks.
17. Advance.
18. Retreat.
19. 1 G. main deck hammocks.
20. 2 G.'s lower deck hammocks.
21. 3 G.'s orlop deck hammocks.
22. Bed call.
23. Mark time.
24. Quick march.
25. Double march.
26. Left turn—three short G.'s.
27. Commence firing.
28. Cease firing.
29. Halt.
30. General salute.
31. Stand for grace.
32. Lie down.
33. Rise.
34. Sweepers.
35. Extra drill.
36. Divisional calls.
37. Duty boat's crew.
38. Whaler's crew.
39. Pinnace's crew.
40. Launch's crew.
41. Duty boys call.

SPIRITUAL INSTRUCTION.

The chaplain reads prayers every Sunday morning, Good Friday, and Christmas day, and preaches a short, simple sermon. On Sunday afternoons, two of the schoolmasters read instructive and interesting stories to the boys, from 3 to 4 o'clock, during which time the ship is otherwise quiet. From 6 to 6.45 on Sunday evenings, after supper, they practice singing hymns. The chaplain also visits the ship twice a week to give each watch instructions, in turn, for one hour. He also visits the infirmary ashore.

EXPENSES.

The following is stated as the daily expenditure per boy:

	s.	d.
Provisions, necessaries, and clothing	1	0
Heating, cleaning, lighting, and water supply	0	1
Officers' salaries, rations, and uniforms	0	5
Furniture and repairs, rents, rates, and sundries	0	4½
Total daily cost per boy	1	10½

or about £35 a year.

Provisions and clothing, of course, form the largest items; of the former, during the past year, there were the following quantities used:

Beef and mutton	pounds	80,600
Potatoes	"	151,484
Flour	"	29,120
Cocoa and sugar	"	28,160
Rice	"	10,400
Currants	"	3,90
Vegetables	bushels	200

The dietary is the best of those of the mercantile training-ships, and is as follows:

	Breakfast.			Dinner.							Supper.		
	Cocoa.	Bread.	Butter.	Fresh meat cooked and free from bone.	Meat pie.	Irish stew.	Currant pudding.	Rice (with 1 oz. of sugar).	Potatoes (cooked).	Bread.	Cocoa.	Bread.	Cheese.
	Pint.	*Oz.*	*Oz.*	*Oz.*	*Oz.*	*Pint.*	*Oz.*	*Oz.*	*Oz.*	*Oz.*	*Pint.*	*Oz.*	*Oz.*
Sunday	1	7	½	5	.....	.....	6	.....	8	3	1	7	1
Monday	1	7	½	.....	13	.....	.....	.....	8	.....	1	7	1
Tuesday	1	7	½	5	.....	.....	.....	4	8	4	1	7	1
Wednesday	1	7	½	5	.....	.....	.....	.....	8	4	1	1	1
Thursday	1	7	½	5	.....	.....	6	.....	8	3	1	7	1
Friday	1	7	½	.....	.....	1	.....	.....	.....	4	1	7	1
Saturday	1	7	½	5	.....	.....	.....	4	8	4	1	7	1

At supper ½ oz. of butter may be given in lieu of 1 oz. of cheese.

Cocoa to be made with 1 oz. of cocoa and ½ oz. of sugar per pint.

Meat pie to consist of 5 oz. of meat, cooked and free from bone, 5 oz. of flour, and 1 oz. of suet, per ration.

Irish stew to contain 5 oz. of meat, cooked and free from bone, 12 oz. of potatoes and other vegetables, and 3 oz. of dumpling, per pint.

Currant pudding to be made with 1 oz. of currants, 1 oz. suet, and 3 oz. of flour, per ration.

Green vegetables to be given as may be considered necessary, and salt, pepper, &c., at discretion.

For boys while on the brigantine the allowance of cooked meat is to be increased to 8 oz. each per day. Boats' crews, in cold weather, receive, in addition, 8 oz. of bread and 3 oz. of cheese per boy, at the discretion of the captain-superintendent.

As a consequence of this diet, combined with the excessive personal cleanliness enforced, the boys make a far better appearance than any others of the class I saw. Something should be said, also, for the excellent ventilation of the ship throughout. Great numbers of narrow ports were cut on the lower decks, and so arranged that no drafts could be felt by those near them. This last is a subject to which too little attention has been paid in either the naval or mercantile service, the want of ventilation of most ships being abominable and life-destroying. Once a fortnight, also, every boy is examined, stripped, in the presence of the captain and surgeon. Any case of skin disease, which thus, of course, is soon discovered, is immediately removed to the shore infirmary. This practice accounts for the very great freedom from such diseases on board, there being but 28 cases the past year, or 3.82 per cent. of the boys in the ship during that time. On leaving, each boy is presented with a certificate, of which the following is a copy:

METROPOLITAN ASYLUM DISTRICT.

No. on ship's books.	

EXMOUTH TRAINING-SHIP.

Certificate of conduct and ability.

Name.	Age.	Time served in training-ship.	Time served at sea in brigantine Steadfast, tender to the Exmouth training-ship	* Class in seamanship.	* Class in school.
		From	From to		

SEAMANSHIP QUALIFICATIONS.	SCHOOL QUALIFICATIONS.
Lead-line and compass.....	Reading ..... Writing ..... Arithmetic ..... Special subjects, such as geography, history, &c.. Elementary navigation .....
Knotting and splicing	
Rowing and steering	REMARKS.
Loosing and furling sails.....	
Reefing sails	
Sewing canvas.....	GENERAL CONDUCT AND CHARACTER.
General activity aloft.....	

* 1st is highest; 5th is lowest.

Dated this —— day of ——, 18—.

—— ——, *Captain-Superintendent.*

—— ——, *Chief Officer.*

—— ——, *Head Schoolmaster.*

This is not a reformatory ship, and no convicted boys are entered on board.

Since March 15, 1876 (the date of the establishment of the Exmouth), the following numbers have been admitted and discharged:

876 boys have been admitted.

202 boys have been discharged to sea service.
29 boys have been discharged to the Army as musicians.

90 boys have been discharged by order of the boards of the unions from which they came.
5 absconded.
3 were discharged to situations.
2 died.

331 total discharged.

These are boys who, otherwise, in most cases, would have formed a part of the great pauper class of England; they are, instead, in the way of becoming good sailors and respectable members of society. From all I heard, they turn out well; nearly all revisiting the ship every time they return to England, and in most cases keeping up a correspondence while abroad. I think charity can take no better form, as applied to young boys, than it has in the case of this institution.

CHAPTER IV.

THE INDEFATIGABLE.

This ship, which I regret having been unable to visit, is moored in the Mersey, off Liverpool, and has as its object the training of the orphans and sons of seafaring men connected with the port of Liverpool, and of boys whose parents may be unable to support them. Preference is given always to the former class.

The following, relating to the ship, is taken from the last annual report and from correspondence with the commanding officer.

The ship depends entirely upon contributions and subscriptions for its support, and a considerable amount of money is paid into its treasury by American passengers on board of English steamers between New York and Liverpool, who give, not knowing, in most cases, its destination, which is certainly a most laudable one.

The committee of management comprises some of the most prominent names of Liverpool, most of the great ship-owners being represented. The mayor of Liverpool is president ex-officio.

GENERAL RULES.

Boys of all religious denominations are eligible for admission.

No boy is received on board under twelve or over fifteen years of age, nor is any one retained who does not show an aptitude for a sea-life

The period during which a boy may remain on board is intended to be not less than three years. This period is not extended except by special sanction of the committee in individual cases.

Life-governors or others willing to contribute not less than £100 to the funds of the institution, or an annual subscription of £10, have a right to nominate a boy for each such donation.

The general committee, under whose management the ship is, must consist of not more than forty members. An executive committee, of not more than ten members, is elected by the general committee. The executive committee is obliged to meet twice in each month, three members forming a quorum.

BY-LAWS FOR THE MANAGEMENT OF THE SHIP BY THE EXECUTIVE COMMITTEE.

1. The general committee shall meet in the months of January, April, July, and October in each year; the committee shall appoint a visitor to the institution from among their body, who shall remain in office three months. The visitor shall visit the ship not less than once a month, to see that the admissions are in accordance with the orders of the committee and the general arrangements for the management of the ship properly carried out. At his last visit he shall make an official report in the form provided by the committee.

In case any visitor shall be unable to attend to his duties, he shall procure a substitute from among the members of the committee. The committee shall also, once a year, at such time as may prove most convenient, make a visit of inspection and examination of the boys on board the ship.

2. The captain shall live on board, and have sole charge of the vessel intrusted to his care, and shall see that all the officers on board rightly discharge their duties.

He shall be responsible to the committee for the good government of the ship, and for the due execution of all regulations pertaining to it. While enforcing strict discipline, he shall endeavor to gain a salutary influence over the boys individually, and, by instilling into them Christian principles, seek to urge upon them the importance of leading a life of duty and usefulness.

3. He shall be responsible to the committee for the quantities and qualities of all supplies received on board the ship, and for the proper application of such supplies.

4. He shall keep, or cause to be kept, the following books, viz:

A REGISTER BOOK, in which shall be contained an account of the boys received into and discharged from the ship under his care; of their conduct while on board; and, as far as possible, their conduct after their discharge.

A DIARY OR JOURNAL, in which shall be inserted everything of importance relating to the ship and to the discipline of the boys.

A PUNISHMENT BOOK, in which shall be recorded all punishments or privations inflicted—specifying the date, the nature, and the extent of the punishment, and the cause thereof.

A CASH BOOK, in which shall be entered particulars of all moneys received for or paid on account of the ship by the captain.

A GENERAL ORDER BOOK, in which shall be entered all new regulations, &c., communicated to him by the secretary; copies of which shall be kept by the secretary in a separate book.

A VISITORS' BOOK, in which shall be inserted the names of visitors, whether members of the committee or not, with the dates of their visit.

He shall once a fortnight send in to the committee a written report of the state of the ship, and attend to give personal explanations to the committee when required.

5. The captain shall have power to punish boys under his charge by deprivation of privileges, or by degradation from their place in the vessel, or by corporal punishment—such corporal punishment not to exceed twelve strokes with a birch, strap, or cane; but no corporal punishment shall be inflicted except in the presence and by order of the captain.

6. The diet shall be sound, wholesome food, and the rations shall be settled from time to time as the committee shall deem expedient. The provisions shall be well dressed and served at stated hours, and the strictest punctuality shall be observed.

7. The Sunday shall be strictly observed, and none but indispensable labor performed on that day; and it must be the object of the captain and officers, in the religious observance of the day, to make it happy as well as instructive.

8. In addition to any ordinary and appointed day of visiting, the captain may, at his discretion, permit visits of the relatives or friends of the boys, by special application, made in writing, three days previously; but, unless under very exceptional circumstances, the committee do not wish any boy to be visited by parents or friends until he has been two months on board the ship.

9. All letters to or from the boys shall be opened by the captain, who shall retain them if they appear to be unsuitable, and afterwards send them to the secretary. The boys are prohibited from receiving any present without the consent of the captain.

10. No stranger shall be admitted on board the ship without an order from a member of the committee, or the permission of the captain, or his authorized representative should he be absent.

11. No officer or person belonging to the ship shall receive any gratuity, on pain of dismissal.

12. The appointment and discharge of officers shall rest with the executive committee, but the captain shall have power to suspend for misconduct, pending the decision of the committee.

GENERAL COURSE OF EDUCATION, INSTRUCTION, AND DISCIPLINE.

The boys are divided into two watches, port and starboard. During school hours they are under the schoolmaster, who is assisted by a pupil teacher. The studies are reading, writing, arithmetic, scripture, spelling, dictation, geography.

During nautical instruction the boys are under the captain and seamen instructors, by whom they are exercised in all the duties of practical seamanship; are taught the compass; rule of the road; use of the lead; heaving the log; management of boats; knotting and splicing; handling masts and yards; handling sails, and generally in practical navigation.

The boys all do their own cleaning on board; make, wash, and mend their own clothes. They are divided into messes of about 14 boys each, under the charge of a petty officer, who is selected for his general good conduct and trustworthiness.

Prayers are read twice each day, and divine service is performed on Sundays.

The number of boys received, during 1878, was	86
The number on board, at the end of 1877, was	243
Total	329
Of these there were sent to sea as apprentices	16
Ordinary seamen	53
Stewards	7
Sent on shore as unfit for sea	20
Died	2
Royal Navy	4
Total	102
Leaving on board December, 1878	227

EXPENDITURE, ETC.

			£	s.	d.
Salaries and wages			1,205	8	4
Provisions			1,644	6	2
Maintenance and repairs of ship			411	10	4
Clothing for boys (£202 18s. 6d. on hand)	£705 7s. 3d.				
Less profit from clothing made and repaired on board	110 9 2				
			594	18	1
Coals, light, water, &c			157	5	5
Furniture, bedding, &c			102	3	7
Printing, books, stationery, and advertising			127	5	0
Medical, &c., expenses			80	9	0
Rewards to boys for good conduct			23	1	7
Outfit for 102 boys sent to sea	£366 2s. 0d.				
Deduct amount received from boys towards their outfit, &c	£53 15s. 0d.				
Enrollment fees, R. N. R	66 0 0				
		119 15 0			
			246	7	0
Office expenses (including collector's commission)			266	8	8
Expended in working the institution during the year 1878			4,859	3	2

Each boy sent to sea has cost (taking the last as an average year) £60.

THE FELTHAM INDUSTRIAL SCHOOL.*

Not to be passed over as training-schools for boys destined for the sea, are the industrial schools such as that at Feltham, which has taken the foremost rank as a school of the kind. It is a reformatory establishment for convicted boys, and is conducted on the half-time system. It is an admirably managed institution, and Captain Brooks, a retired officer of marines, has received high praise for the success of the place. What makes the mention of it proper here is that there is in the grounds a brig, built from the berth-deck upward, upon which the boys, who have selected a seafaring life, are exercised. Fifty-six boys were sent to sea from this place last year, six of whom entered the navy as bandsmen, much attention being also given to music.

This method of having a means of nautical training attached to institutions of this kind is very well thought of. Many boys thus receive sufficient training to fit them to early become good sailors, and a taste for the sea is fostered in a class for which there is too little employment of a fixed kind.

The great defect of the mercantile training systems now in use in England is that too many of the vessels are mere reformatories, which send into the service boys with bad antecedents. Too great a supply of such boys tends to cast a stain upon the profession and cause it to be looked upon as a refuge for the destitute, worthless, and vagabond class. The great aim ought to be to elevate it as a reputable calling; to make men think and feel that it is as respectable as any other manual labor, the general thought and feeling of parents being that for a boy to go to sea is to go entirely to the bad. This latter feeling of course is strengthened in the service itself, where too many of a depraved class are sent from reformatory institutions and houses of refuge. The aim ought rather to be to attract volunteers to the training-ships, and not, as in too many cases in England, require that the boy should be a pauper before he can have the advantages and facilities afforded by these vessels.

The attitude of the public mind in regard to the sailors' calling has arisen from observation of the class employed rather than from any thought that it is in itself a bad or brutalizing one. There surely is no profession which calls for higher or more manly traits; there is scarcely any in which the laboring man is better paid. Improve our ships and the accommodations of the crew; have them commanded by educated men instead of the brutal masters by too many of whom our merchant marine was at one time disgraced; educate the seaman himself to a level with others who earn their bread by manual work ashore; teach him to be something more than the dependent creature who must be looked after as a child, and we shall remove one of the greatest stains which still remain upon our civilization and render a material benefit to the country, not only in a moral way, but in the material one of a safer and more extended commerce.

*This school is mentioned amongst those in the parliamentary returns regarding training-ships, being represented there by the Endeavor.

CHAPTER V.

TRAINING-SHIPS FOR OFFICERS IN THE MERCHANT SERVICE.

THE WORCESTER AND CONWAY.

The Worcester in the Thames, off Greenhithe, and the Conway in the Mersey, off Liverpool, are both designed as colleges for the education of boys of good parentage and position in life and destined to serve as officers in the merchant service. The former is under an association formed for the purpose of remedying the difficulty experienced in providing properly-qualified officers for the mercantile marine; the latter is under the Mercantile Marine Service Association, incorporated by act of Parliament. The Worcester is the only one of the two ships I was able to visit, but they are so alike in general character and design that I shall speak of them together.

The great necessity for some such schools is shown by the official returns regarding British shipping.

According to the returns of 1877 of the board of trade there were in the British merchant service 6,634 vessels of over 300 tons; allowing a master and two mates to each, nearly 20,000 officers are required for these ships, nearly three thousand of which are vessels of over 800 tons register, and of course proportionately important and responsible commands. In 1876 the deaths alone of officers were over 500. It may be taken that nearly 1,000 men yearly are required to keep up the complement. In the eighteen years of the Conway's establishment, 1,300 young men (or an average of 70 per annum) have been sent afloat—the Worcester may in time average as many more—but this is but a small percentage of the number required. To afford an opportunity for the acquirement of such an education as is here given, there should be, to supply even half the demand for officers, eight such ships or schools instead of two. They need not necessarily be afloat; many able men in England think it much better they should not be—a school ashore with small tenders for practice afloat being advised as preferable in every way.

The importance of having capable men as commanding officers must be recognized even by those less conversant with the sea, when one comes to know the vast interests intrusted to the care of a captain. The ship he commands may have cost a million, her cargo may represent another million, and the souls on board be reckoned by hundreds. In none other of the ordinary callings of life do such responsibilities fall upon one man. What physique can be too strong, what brain or intelligence can be too fine, to meet the calls upon those of the master of a

great steamer who must traverse the stormy seas of the North Atlantic in all seasons and under all circumstances? From year to year these responsibilities have been increasing; ships are larger; the cargoes proportionately more valuable; the number of passengers carried greater; but there has been no proportionate effort, in this country at least, to furnish men fitted for the duties of carrying such ships in safety from port to port. The Worcester and Conway have been established to, in some degree, meet this want in Great Britain. They are under the fostering care of those interested in shipping, but are entirely self-supporting, depending wholly upon the number of their pupils.

The following is the prospectus of the Conway, which I give as being more full than that of the Worcester. It practically applies to the latter also:

MERCANTILE MARINE SERVICE ASSOCIATION.

(Incorporated by special act of Parliament.)

SCHOOL SHIP, HER MAJESTY'S SHIP CONWAY.

This institution, now conducted on board Her Majesty's ship Conway (moored in the river Mersey, off Rock Ferry), is designed mainly to train and educate boys intended for officers in the merchant navy. Boys intended for the Royal Navy are also admitted and receive special training for that service.

There is a complete and efficient nautical and educational staff maintained, by whom the boys are carefully and regularly instructed and exercised in all the duties of a first-class ship, and receive the general education mentioned below.

Her Majesty, the Queen, has been pleased to declare her intention to present, annually, a gold medal to the boys of the Conway.

Her Majesty's wish, in the establishment of this prize, is to encourage the boys to acquire and maintain the qualities which make the finest sailor. These consist of cheerful submission to superiors, self-respect and independence of character, kindness and protection to the weak, readiness to forgive offense, desire to conciliate the differences of others, and, above all, fearless devotion to duty and unflinching truthfulness.

The following regulations will, by Her Majesty's command, be observed in awarding the prize:

"The medal will be open to boys who have been one year on board ship and have received not less than one-half the total number of marks at the previous quarterly examinations.

"The commander, after conferring with the head masters, shall select not less than three and not more than five of the boys whom he considers to possess the qualities for which the prize is given. He shall then submit these names to the boys who have been assembled for the purpose in the school, and each boy who has been on board six months previously to the time of distribution shall then and there vote for one of the boys so selected. The boy who obtains the highest number of votes shall receive the medal.

"These regulations shall be placed on the main deck, to be called the 'Queen's prize list,' and the name of each boy who receives the medal shall be recorded upon such list."

Six appointments as midshipmen in the Royal Naval Reserve are annually granted by the Lords of the Admiralty.

In addition to the foregoing appointments, the committee are glad to state that appointments as leadsmen apprentices in the Bengal pilot service are yearly placed at their disposal through the kindness of the secretary of state for India. The committee feel that it should be widely known that they consider themselves most fortunate in obtaining such desirable openings in life for pupils educated on board the Conway.

By order of the board of trade, two years on board the Conway will be reckoned as one year at sea. *The committee recommend that the boys should not leave the Conway at the end of the second year unless well advanced in their professional studies.*

Besides other advantages, many of the committee and leading ship-owners of Liverpool will give a preference to the cadets of the institution and receive them as apprentices without a premium, *on their course of two years being complete to the satisfaction of the commander, and they not being under sixteen years of age.*

The terms of admission are FIFTY GUINEAS per annum, payable half yearly in advance; £29 10*s.* the first half-year, and £23 the second half-year. This charge includes uniform and outer clothing, medical attendance, washing, use of books and stationery.

The parents and friends of boys are required to find their underclothing and boots.

The sons of nautical members of the Mercantile Marine Service Association, and of deceased and unfortunate members of the merchant service, have privileges in admission (regulated by the subscriptions and by the powers given by the subscribers to the committee), and those of officers in the Royal Navy are admitted at 40 guineas, instead of 50 guineas, per annum.

Applications for the admission of boys must be by form (supplied), be accompanied by certificate of birth, a testimony of their good character from their last schoolmaster, or, when educated at home, from the clergyman or minister of the church they attend, and a medical certificate that they are healthy.

Boys who have completed their course can remain on board when there is room until they can obtain ships, paying four guineas per month in advance.

NO BOYS ARE RECEIVED UNDER THE AGE OF TWELVE, OR WHO HAVE PASSED THEIR SIXTEENTH BIRTHDAY. Boys entering under thirteen years of age will not be entitled to a Conway certificate until they have been three years entered.

No boy will be considered eligible who cannot read, write, and spell fairly, and work correctly questions in the simple rules of arithmetic. A previous knowledge of algebra and Euclid will be found very advantageous.

Boys are not enrolled unless passed by the medical officer of the ship and approved by the commander.

The sessions commence on the 1st of August and 1st of February; but boys are entered also at the quarters commencing on the 10th of October and the 10th of April.

Visitors are admitted to the ship only between the hours of 2 p. m. and 4 p. m. on Wednesday. On that day a boat will be in attendance at the Rock Ferry slip at 1.45 p. m. to meet the Rock Ferry boat, which leaves the landing stage, Liverpool, at 1.30 p. m. and will take visitors on board. The only exception to this rule is in favor of friends or parents not residing in or near Liverpool, who intend to send boys to the school and are unable to come on Wednesday, who will be received on other days on writing to the commander for an order. Boats leave the ship daily (weather permitting) at 8, 11 a. m., and 12.30, 1.30, 4.30, 5.30 p. m.

The terms are at all times subject to revision.

GENERAL SCHEME OF EDUCATION, INSTRUCTION, AND DISCIPLINE.

In school all the pupils are under the two senior masters and their assistants. Their studies comprise:

English grammar.	Geography.	Geometry.	Nautical astronomy.
Reading.	Writing.	Trigonometry.	Swimming.
Composition.	Arithmetic.	Navigation.	Chart-drawing.
History.	Algebra.		

During nautical instruction the pupils are under the commander and nautical staff, when they are exercised in all the duties of a first-class ship, and are taught knotting, splicing, reefing, furling, heaving the lead, the marks on the lead-line, heaving the log, the management of boats, and practical navigation generally.

French is taught on two afternoons in each week. Latin is only taught when re-

quired by parents at an extra charge of £1 1*s.* each half year. Lectures on various subjects of interest are given occasionally, as well as general instruction in some of the most useful and practical departments of surgery and medicine.

The boys are taught to sling and lash up their own hammocks. Each in his turn serves as messman for one day to his mess, under the inspection and guidance of the captain of the mess. In turn, the boys keep an anchor watch, two at a time, for two hours.

On two afternoons in each week the boys are landed for recreation. Leave on Saturday and Sunday is granted occasionally on written application being made to the commander or officer in charge.

The captains of subdivisions are boys, who for exemplary conduct have been selected for these positions of trust and authority. They are exempt from the manual labor of washing decks or being messmen, and there are other privileges attached to the office which make it an object of emulation to the well-disposed.

Divine service is performed on Sundays, and prayers are read twice each day.

The holidays are from the 1st to the 31st of July, and from the 20th of December to the 31st of January.

The system of education is framed with a view to the boys remaining on board not less than two years.

Should the doctor of the ship consider it necessary, on account of contagious or infectious disease, to order a pupil's removal to the hospital, the parent or guardian will be held answerable for the expense incurred.

EXTRACTS FROM GENERAL REGULATIONS.

No money is returned for boys withdrawn during the half year, unless the removal is at the commander's request, or the boy is expelled, in which case a return is made proportionate to the number of unexpired weeks. In *all* cases a quarter's notice or a quarter's fees are required previous to the removal of a pupil. A similar charge is made to those who bespeak a vacancy of which they do not avail themselves.

No clothing-money is returned even if a boy is expelled, or withdrawn at the commander's request, but he may take the clothing away when he leaves, less the badge and buttons.

Corporal punishment is only administered to boys whose names have been struck off the good-conduct list, or for first offenses of a very serious kind. The parents or guardians of boys may, at the beginning of the half year, give the commander notice that they object to birching under any circumstances. In that case they will be called upon to remove the boy, should he commit any offense meriting a birching, and all fees paid on his account will be forfeited.

The committee, on each boy's course of not less than two years being completed *to the satisfaction of the commander*, will endeavor—but do not bind themselves—to obtain a situation for him on board a ship, the owners of which are known to them.

Parents and friends of boys are requested to deposit the money they wish the boys to have with the chaplain, who will pay it to them at a rate not exceeding one shilling per week.

CLOTHING.

The clothing provided by the committee for one year's use consists of: Two uniform caps, badges, and covers; one uniform blue cloth jacket, waistcoat, and trousers; two pair pilot trousers; two blue uniform working jackets; and the following articles to be provided by pupils and to be *marked* with boy's name in *large* letters:

		£	*s.*	*d.*
Three white shirts	each	0	4	3
Three blue Crimean flannel shirts	each	0	7	0
Three night-shirts	each	0	4	0
One pair drill trousers		0	8	6
One pair braces		0	1	0

		£	s.	d.
Six pair worsted socks	each pair	0	1	6½
Six colored handkerchiefs	each	0	0	4
Two black silk neck-ties	each	0	0	10
Two pair boots, elastic	each pair	0	13	6
Three merino singlets	each	0	3	9
Three pair merino drawers	each	0	4	0
One duck bag		0	2	6
Four towels	each	0	0	9
Hair-brush, comb, clothes-brush, and two blacking-brushes		0	5	6
Two pair sheets	each pair	0	4	9
One pair blue pilot-cloth trousers		0	16	6
Three strong calico pillow-cases	each	0	0	11
Monkey jacket		1	6	6
Knife, fork, and spoon (with name engraved on each)	the set	0	4	9
Belt		0	2	3
Gloves (kid)	each pair	0	2	9
Scrubbing-brush		0	0	6
Sea-boots		0	17	6
One sea-chest		1	14	0
Cap, balmoral		0	2	0
Jumper, blue serge		0	6	9
Linen collar	each	0	0	5
Paper ditto	each doz	0	0	6
*Suit of waterproof and Southwester, or		0	16	0
Oil suit and Southwester		1	2	6
Bible and prayer-book				

Each cadet has a large chest for clothing. All the chests of the division are kept together in the sleeping quarters, which are divided by bulkheads so that there can be, at night, no communication between boys of different divisions.

The practical facilities for training in seamanship are slight, the ships being permanently moored and having no tenders. In the training of the cadets they are made as self-dependent as possible, very few servants being allowed, it being taken for granted that a young boy is none the worse for a little rough work.

The general work of the ship (I speak here of the Worcester) is chiefly done by the pupils; they furnish the boats' crews; look after the cleanliness of their quarters; clean bright-work, and in general are by no means coddled. This was particularly striking as they seem to belong to an exceptionally high class of boys; the sons of many distinguished and influential men being on board. This fact augurs well for the English merchant service; it is due, no doubt, to the overcrowded state of most of the professions in Great Britain, and the sons of well-to-do people are obliged to seek positions elsewhere than in the Army, Navy, or law. Certainly one of the best fields seems to be the mercantile marine; the command of a vessel like the Germanic or Arizona ought to be a position worthy of being sought. Of course the education acquired

*A suit of waterproof and Southwester will be required at the end of the first session.

cannot, under the circumstances and time allowed, be very extended or thorough. The prospectus of the Worcester states that, "besides the usual branches of a sound English education, algebra, geometry, trigonometry, mechanics, steam-engineering, marine surveying, free-hand and chart drawing, and the French language are taught on board."

I append some of the examination papers set at the last quarterly examination, but judging from the report of the examiner, Mr. Escott, head master of Greenwich school, published in the last yearly report of the Worcester, the pupils are by no means up to the papers which, considering their age and the short time allowed for the work laid down, is not surprising. This is generally the case in English schools; a much smaller percentage of correct answers being allowed than is allowed in examination papers in this country, where they are usually made with more real reference to the pupil's ability and amount of study.

ENGLISH GRAMMAR.

(Time, 2 hours.)

1. Give the singular and plural forms of journey, knife, effluvium, this, we, genius, Mussulman, vertex, aid-de-camp, son-in-law.

2. Give the masculine and feminine forms of colt, duchess, ewe, czar, father, steer, hero, goat.

3. Decline son, ox, lady, goose, thou, who.

4. Compare happy, evil, many, beautiful, near.

5. Distinguish between transitive and intransitive verbs. Give two examples of each.

6. Correct or justify the following:

(*a*) He is taller than me.

(*b*) A large number of cadets was present.

(*c*) Who do you speak to.

(*d*) Drink deep, or taste not the Pierian spring.

7. Parse the sentence—

My father lived at Blenheim then,
Yon little stream hard by;
They burnt his dwelling to the ground
And he was forced to fly.

8. Write a short essay on one of the following:

(*a*) A sailor's life.

(*b*) A modern invention.

(*c*) An eminent Englishman.

MAGNETISM.

(Time, 2 hours.)

1. What are the leading points to be attended to in selecting a standard compass?

2. Explain the method of obtaining the deviation of the compass by an amplitude of the sun.

3. From the following compass bearings of a distant object determine the correct magentic bearing and the deviation for those positions of the ship's head:

Ship's head by compass.	Bearing of distant object by compass.	Ship's head by compass.	Bearing of distant object by compass.
	° ′		° ′
N.	S. 62 0 E.	S.	S. 69 0 E.
N. E.	S. 45 40 E.	S. W	N. 88 0 E.
E.	S. 37 30 E.	W.	N. 85 0 E.
S. E.	S. 41 50 E.	N. W.	S. 83 40 E.

4. Are deviations subject to change when the ship changes her geographical position? Explain your answer.

5. Describe the construction of Napier's Diagram.

6. Taking a large magnet to represent the earth, and passing a smaller magnet over it, explain the different positions the smaller magnet would take. Draw a figure, marking the red and blue ends by the letters R. B.

7. What do you understand by the terms permanent, subpermanent, and induced magnetism?

8. Describe the nature and law of semicircular deviation.

METEOROLOGY.

Based on Buchan's introductory meteorology.

1. Suppose that a ship's barometer were carried into the maintop, would it read higher or lower there than on deck?

2. What is "convection" and how does it act in the heating of water?

3. When the wind is east over the whole of the British Islands, what parts will have the highest and what parts the lowest barometer readings?

4. What does "evaporation" mean? For instance, what change takes place in the water of wet clothes when they are hung out to dry?

5. Explain the "cumulus" cloud, and how is it formed?

6. Is the annual rainfall greater on the eastern or western coast of Great Britain; and if there is a difference, what causes it?

7. What is the difference between a monsoon and a trade wind?

8. In what direction or path do most European storms travel?

Based on instructions for keeping a meteorological log.

9. When a ship has private instruments as well as those furnished by the meteorological office, why should they be compared and their differences noted in the log at the commencement of a voyage?

10. What effect has the speed of a ship on the *direction of the wind* as shown by her vane, and how can an experienced seaman discover the *direction of the wind* without looking at a vane?

ALGEBRA.—NAUTICAL DIVISION.

(Time, 3 hours.)

1. If $a=4, b=2, c=0, x=5, y=3, z=1$, find the numerical value of $a^b+2x^y-c^x+4z^a$.

2. Multiply $a^2+b^2+9-3a+3b+ab$ by $a-b+3$.

3. Find the fourth power of $2x-3y$.

4. Divide x^6-y^6 by x^2-xy+y^2.

5. Extract the square root of

$$a^8-4a^7b+4a^6b^2+6a^5b^3-14a^4b^4+4a^3b^5+9a^2b^6-6ab^7+b^8.$$

6. Simplify $x-[\{2x-\overline{x-3(2x+y)}\}-3(2x-y]$.

7. Solve the equations—

(a) $3(2x-3)-\frac{x+7}{2}+\frac{3x-1}{5}=\frac{x-4}{4}$

(b) $4(x-6)-\frac{x}{3}-\frac{2}{5}(x+10)=\frac{13}{10}(x+5)-1\frac{1}{4}$

8. A, B, and C have a certain sum of money divided among them; A has £5 less than half; B has £3 less than A; C has £7 10*s.* less than B: find the sum divided.

9. Solve the equations $\frac{x+3y}{3}-\frac{2x-7y}{8}=\frac{1}{3}=\frac{x}{12}-\frac{y}{4}$

10. Reduce $\frac{2x^4+3x^3-11x^2+3x}{3x^4+9x^3-7x^2-12x+4}$ to its simplest form.

11. Solve the equations—

(a) $\frac{2}{3}(x^2-x)-\frac{1}{4}(2x^2-3)=\frac{x}{12}$

(b) $\left.\begin{array}{l} x^2+xy-6y^2=21 \\ xy-2y^2=4 \end{array}\right\}$

12. Rationalize the denominator of the fraction $\frac{2\sqrt{2}+3\sqrt{3}}{4\sqrt{3}-7\sqrt{5}}$

13. Find x so that the ratio $a-x:b-x$ may be the duplicate of the ratio $a:b$.

14. What is an arithmetical progression? Investigate an expression for the sum of n terms of an arithmetical progression.

THEORETICAL NAVIGATION AND NAUTICAL ASTRONOMY.—NAUTICAL DIVISION.

(Time, 3 hours.)

1. Define course, departure, distance, and, from your definitions, prove that dep. = distance sin. Sin. Co.

2. Prove the formula used in parallel sailing.

3. In what sailing is a modification of the formula in question 2 used? Prove the formula here referred to.

4. What do you understand by great circle sailing? What is its great advantage? Why is it more applicable to steam than to sailing ships?

5. Investigate an expression for finding the shortest distance between two places whose latitudes and longitudes are given.

6. Define ecliptic, right ascension, prime vertical, hour angle, altitude.

7. Define sidereal time. Why do you take sidereal time from Nautical Almanac when you want right ascension of the mean sun, *e. g.*, in a star chronometer?

8. Show by a figure that the latitude of a place is determined by adding the meridian zenith distance and declination when they are like names, and subtracting when they are unlike.

9. Investigate an expression for the correction for finding the meridian altitude from an altitude near the meridian.

10. Show that cos. lat. = sin. dec. × cosec. amplitude.

11. Prove the rule for clearing a lunar distance from the effects of parallax and refraction.

The following are the last nine of the fourteen questions in steam-engineering:

5. Describe the course of the steam from the boiler through a compound engine to the boiler again as water. It is a surface condensing engine. Name every pipe, chamber, or valve through which it passes.

6. A gauge glass mounting is as shown on a sketch given, with eight cocks, lettered A, B, C, for the tests cocks; D, E, for the gauge glass connections; F, for the drain cock; and G, H, for the boiler connections. If you find the gauge full of water, what would you do to make sure that the indication given is correct? Also what would you do if you found only steam at the cocks A, B, C, and F?

7. Work out the indicated horse-power for the cards given. The particulars are stated on the cards; there is only one cylinder.

8. Describe the course of the injection water in a common marine engine from the sea to the sea.

9. Of what parts does a steam piston consist? Which of these has most wear? Which of the pieces are made of steel?

10. Why do the fire bars slope down towards the back of the furnace?

11. What is the principal advantage of surface condensation?

12. How many pounds weight of steam is equal to one horse-power indicated without expansion and without loss for one hour at a pressure a little above atmospheric pressure?

13. If the efficiency of expansion is represented by the coefficient 1.8, how many pounds of steam are used per indicated horse-power per hour?

14. When the sea-water is 56° F. and the temperature of the discharged circulating water is 100° F., how many pounds of circulating water are used per pound of steam?

The following are samples of the 78 questions on the rule of the road:

(Time 48 hours.)

* * * * * * *

13. What is the number of lights required by the regulations to be carried by steamships when under steam at night?

14. Of what color are these lights, and how are they to be placed on board the ship?

15. Over how many points of the compass, in what direction, and how far, is the foremast-head light of a steamer required to show?

16. Are they required to be fitted with screens; and, if so, on what side and of what length?

17. Over how many points of the compass, in what direction, and how far, are the colored side lights of steamers required to show?

18. What description of lights are steamers required by the regulations to carry when they are not under steam, but under sail only?

19. What exceptional lights are to be carried by small sailing vessels in certain bases?

20. What description of light are sailing pilot vessels required to carry?

21. What lights are open boats and fishing boats required to carry.

* * * * * * *

43. A is a steamer going north, and seeing a white and green light ahead. Are A and B meeting, or is B passing A, or is B crossing the course of A, and in what direction; and how do you know?

44. As A is going north, within what points of the compass must the vessel showing the white and green lights be steering?

45. How do you know?

46. Is the steamer A to starboard or to port?

47. And why?

48. What would be the result if you ported to a green light ahead?

49. If a steamer A sees the *three* lights of another steamer B ahead or nearly ahead, are the a steamers meeting, passing, or crossing?

50. Do the regulations expressly require the helm of a ship to be put to port in any case; and, if so, when?

51. Do they expressly require the helm of a ship to be put to port in any other case; and, if so, in what other?

52. If you port to a green light ahead, or anywhere on your starboard bow, and if you get into collision by doing so, do you consider that the regulations are in fault?

53. If a steamer A sees another steamer's red light B on her starboard side, are the steamers meeting, passing, or crossing; and how do you know?

54. Is A to stand on; and, if not, why not?

55. Is A to starboard or to port in such a case?

56. If A gets into collision by porting, will it be because she is acting on any rule?

* * * * * * *

The following are the last four questions in practical navigation; whole number of questions 12.

(Time, 4 hours.)

9. May 1, 1878, the observed meridian altitude of β Centauri under the South Pole was 9° 56′ 20″; the index correction was + 4′ 50″; and the height of the eye above the sea was 18 ft.: required the latitude.

10. October 21, 1878 in, lat. by account 33° S. and long. 37° 20′ W., when a chro-

nometer showed $4^h\ 8^m\ 34^s$, the observed altitude of the sun's L. L. (near the meridian) was 67° 34′ 45″, the index correction was + 3′ 40″, the height of the eye above the sea 25 ft., and the error of the chronometer fast on G. M. T. $1^h\ 46^m\ 15^s$: required the latitude.

11. April 2, 1878, in lat. by account 51° N, the following double altitude of Regulus was observed:

Time by chron.	Obs. alt. Sun's L. L.	Bearing.
$3^h\ 27^m\ 56^s$	47° 32′ 10″	SW. by S.
$7^h\ 46^m\ 59^s$	11° 24′ 15″	W. ½ N.

The run of the ship in the interval was SE. by E. 13 miles, the index correction — 0′ 50″, and the height of the eye 27 ft.: required the true latitude of the last observation.

12. May 27, 1878, at $3^h\ 40^m$ p. m. (mean time nearly), in lat. 6° 2′ N. and long. 80° 30′ E., when a chronometer showed $9^h\ 47^m\ 1^s$, the observed altitude of the sun's L. L. (by artificial horizon) was 67° 33′ 40″, the index correction being — 2′ 55″: required the error of the chronometer on G. M. T. and its rate, having given the error on G. M. T. at G. M. noon, April 3, $0^h\ 29^m\ 55^s$ slow.

On leaving, the pupil is given a parchment certificate, in which both his scholastic and seamanship attainments are shown. There are three classes of each, the definitions of all being printed on the back as, follows:

SCHOLASTIC.

ORDINARY CERTIFICATE.—The pupil to whom this certificate was awarded gained at his last half-yearly examination the requisite fraction of the total marks in the following subjects, viz: Practice of navigation and nautical astronomy, trigonometry, pure mathematics, and English.

FIRST-CLASS CERTIFICATE.—The pupil to whom this certificate was awarded gained at his last half-yearly examination the requisite fraction of marks in the following subjects, viz: Theory and practice of navigation and nautical astronomy, plane and spherical trigonometry, pure mathematics, English, magnetism, and meteorology. He can take the altitude of a heavenly body, and understands the principles of the sextant and azimuth compass.

FIRST-CLASS EXTRA CERTIFICATE.—The pupil to whom this certificate was awarded gained at his last half-yearly examination the requisite fraction of total marks in the following subjects, viz: Theory and practice of navigation and nautical astronomy, plane and spherical trigonometry, pure mathematics, English, magnetism, and meteorology. He can deduce the longitudes from his own lunar observations.

General conduct, ———.

(Signed.) ——— ———,

Head Master.

SEAMANSHIP.

CERTIFICATE.—The pupil to whom this certificate was awarded knows the knots, bends, and splices in general use; can furl a royal single-handed; can pull an oar or steer a boat.

FIRST CLASS.—In addition to the above, can strap a block, worm, parcel, and serve a rope, pass an earing, and understands the method of reefing a topsail in the olden manner; can heave the lead and give the soundings.

FIRST-CLASS EXTRA.—In addition to the above, understands how to measure, cut, and fit lower rigging, turn in a dead eye, &c.; has a thorough knowledge of the international code of signals; has a thorough knowledge of the rule of the road.

General conduct, ———.

(Signed.) ——— ———,

Commander.

There are also examination papers in spelling, scripture, grammar, history, geography, arithmetic, French, and trigonometry. The papers here given were all for the most advanced (or first nautical) division, in which were 17 persons. No. 1 of the divison made 80 per cent. of the maximum marks; the ninth, 50 per cent.; the last, but 31 per cent.

The following school routine of the Conway shows the division of time on board that ship:

Hours of study.	Class.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.
9–11 a. m.....	1	Navigation.	Arithmetic and composition.	Navigation.	Trigonometry.	Navigation.
	2	Navigation.	Arithmetic and composition.	Navigation.	Trigonometry.	Navigation.
	3	Arithmetic and writing.	Navigation.	Arithmetic and writing.	History.	Arithmetic and scripture history.
	4	Arithmetic and writing.	Navigation.	Arithmetic and writing.	History.	Arithmetic and scripture history.
11¼–12¼.....	1	History.	French.	Algebra.	Composition.	Scripture history.
	2	History.	French.	Algebra.	Composition.	Scripture history.
	3	Trigonometry.	French.	Algebra.	Trigonometry.	Navigation.
	4	Trigonometry.	French.	Algebra.	Trigonometry.	Navigation.
2–3 p. m.....	1	Physics.	SEAMANSHIP.		Geography.	SEAMANSHIP.
	2	Astronomy.			Geography.	
	3	Dictation.			Geography.	
	4	Dictation.			Geography.	
3–4.....	1	Algebra.			French.	
	2	Algebra.			French.	
	3	Algebra.			French.	
	4	Algebra.			French.	
6½–7¾.....	1	Lecture or extra class.	Navigation.	Trigonometry.	Free.	Algebra.
	2		Navigation.	Trigonometry.		Algebra.
	3		Dictation.	Physical geography.		Algebra.
	4		Dictation.	Physical geography.		Algebra.

Twenty-one boys left the Worcester after the midsummer examination in 1878, and twenty-seven were sent from the Conway. Nearly all of these entered the merchant service as apprentices. Six from each ship received honorary appointments as midshipmen in the royal naval reserve, the marine militia of Great Britain.

The time has come when, if we expect to build up our merchant marine to anything like its former comparative proportions, we must copy such schools, and give that technical education which we have no means of supplying in our present marine afloat. If ships are built, men are necessary to command; and the better trained the brain that directs and controls, the fewer the shipwrecks, the less the loss of life and property. A statement such as this seems axiomatic.

One cannot think of the enormous yearly loss of shipping without

astonishment. In 1877 the losses of the English marine* comprised 560 sailing-vessels and 68 steamers, representing a value, with cargoes, of $18,000,000. With these ships were lost 2,700 lives. In 1875 the total number of wrecks of all nationalities was 4,259; a number equal to that employed in our whole sea-going marine. Two-thirds of these wrecks are, in the case of the English, set down by the British Board of Trade as the result of ignorance and incompetency. There would thus (taking the losses of England alone) be a saving of $12,000,000, if the masters were better fitted for their duties. The interest on this sum (which the results of official inquiry show might be saved) would support eighteen such ships as the Worcester and Conway. The application of an increased intelligence, of a better education and training, would diminish catastrophes by one-third at least; so that from a merely monetary point of view the establishment of such schools would be wise, politic, and economical, apart from all humanitarian considerations, which involve the question of the sacrifice of thousands of lives yearly, chiefly through ignorance and incompetency.

The city of New York expends yearly $3,500,000 in educating the men who are to serve in all the other varied callings found amongst the population of a great city. Only the one hundred and twentieth part of this sum is devoted to the education of those who are expected to sail the ships and carry in safety the vast wealth which enters and leaves its harbor. The unwisdom of such a course in reference to a great seaport seems to me to need no setting forth; the self-interest of the city should serve to enforce a more liberal attitude towards those upon whom its well-being so much depends.

The question, however, is not one only applicable to New York, but to every port from which ships are sailed, and has a national importance well worthy the attention of the national government.

* See Report of British Board of Trade for 1878.

PART V.

NAVAL TRAINING—FRANCE.

PART V.

CHAPTER I.

THE EARLY ORGANIZATION OF THE NAVY.

The systematic recruiting of men for the naval service dates from 1665 (temp. Louis XIV). Previous to this time, when a fleet was fitted for sea, the ports were closed, and a general press of all the seamen needed took place. This brutal and clumsy method was at the date mentioned set aside by a decree, ordering the enrollment of all sea-faring men, who were divided into three classes; each class being obliged to serve one year at a time in the ships of the fleet; during the other two years the men of the class were free to take service in any other capacity.

Various ordinances from 1670 to 1713 tended to ameliorate the conditions of the service to which men were held. If unemployed, they received half pay; a month's pay was granted when permission was given to leave the navy for the merchant service; families were looked after by the state when their heads were at sea; the men enrolled were entitled to free hospital treatment; pensions for wounds and lengthy service were granted. From this time (1713) dates the establishment of the "Invalides de la Marine," to which a certain amount of the pay of all sea-faring men, a proportion of the prize-money, and a moiety of unclaimed wreckage were devoted. These rules remained almost without change until 1784, when it was decreed that there should be only two classes; one of the married, the other of the unmarried, seamen. Levies were made by beginning at the head of the lists and following it down as occasion demanded until the list was exhausted; then *de novo*. Under this decree unmarried men were subjected to one-third longer service than the married. After 60 no one was subject to levy.

The general principles hereinafter mentioned were finally established in 1790, and with slight modifications have held until now. The great principle underlying the law is, that every individual owes service to the state either in the army or navy. If he is not subject to enrollment or conscription in the one, he is in the other. For more than two hundred years the French sea-faring population has been subjected to the action of this law, so that now, strange as some of its regulations may seem to ourselves, it does not seem to bear heavily upon them.

PRESENT ORGANIZATION OF THE FRENCH NAVY.

The men of the fleet are now supplied from the *inscription maritime*, from voluntary enlistments, or in case these two classes are not numerous enough, from conscription. This last is effected in the same way as that for the army, and falls upon all departments which are touched by the tides; as far as the tide goes the conscription extends. The great mass of men belong to the first of the three classes; in this is inscribed every one who has arrived at eighteen years of age, and who has made two deep-sea voyages either in a public vessel or in a merchant ship, or who has been eighteen months in the coasting trade, or two years in the home fisheries, and who declares himself as wishing to continue a sea-faring life. As there are many advantages belonging to a man of the inscription, many of those who come from the conscription seek to be enrolled in it; a thing which is allowed only after a certain time of actual service, and after the passing of an examination.

All persons connected in any way with the working of steam-machinery afloat are likewise subject to the inscription, and are placed upon the same footing as those before mentioned. Every man so inscribed is called to service when he has completed his twentieth year. He must then present himself to a commissioner of the inscription. If this age is attained while abroad, he is obliged to report himself in the month which follows his return to France. As soon as he is enrolled, he is forwarded to the headquarters of the arrondissement, and takes his place in the *division*.

The word "*division*," to be frequently used in the following pages, is the official designation of the depôt at the headquarters or *chef-lieu* of the arrondissement; here, in barracks fitted to the accommodation of several thousand men, are concentrated all the recruits, of whatever kind, coming from the department or arrondissement in which the *division* is established. With a permanent *cadre* of officers, petty officers, and men, amounting for the five *divisions* to about 1,400 men, the organization is always in perfect condition, and new recruits are at once gotten into shape. The total number of men in these five *divisions* is usually about 8,000, half of whom are supposed to be available for sea service.

To return to the subject of recruiting:

Any sailor who has arrived at the age of eighteen and who desires to advance the period of his service may do so, if on examination the authorities are willing to receive him as a desirable person; he may thus begin his service two years before the usual time.

The first period of obligatory service is for five years; the first three years of this period are generally passed in actual service; but at any time, and especially during the last two years of this period, leave may be granted (without pay) to go to sea in any capacity. If, however, the man engages to go only into the coasting trade, on short voyages, or in the home fishery, this time of service is counted as to the state. After

this first period, there is another period of two years, in which the *inscrit* is almost always in this position of "renewable leave." After this, one can no longer be called upon to serve in the fleet unless by special decree, or in case of special armament. All these men who complete three years of service without going on this leave are entitled to a premium of four cents a day.

The following persons are exempt from levy of any kind. The eldest of a family of which both father and mother are dead; a seaman who already has a brother levied; an only son or the elder of two sons, or in default of son or son-in-law, the only grandson, or the eldest of the grandsons of a widow, or of a father blind or entered on his seventieth year. If the eldest son is blind or permanently disabled, the exemption falls to the next younger. If, however, any of the above causes for exemption cease to exist, the men affected by them are required to declare themselves to the commissioner of the inscription, whereupon they are called to serve. Two cents a day are allowed to each child, aged less than ten years, of every sailor of a lower grade than *second-maître* and who is in actual service after having fulfilled the first period of obligatory service.

Every man of the inscription who announces his intention of quitting the sea is taken off the rolls at the end of the year from the time of his declaration; he is then turned over to the military authorities, and is obliged to accomplish five years of service in the army, less his time of active service in the fleet.

ADVANTAGES OF THE INSCRIPTION.

Sea-faring men so inscribed *alone have the right of exercising the profession;* they are free of all public service other than that in the navy or in the marine arsenals; they are exempt from having soldiers billeted upon them during the time of their service and for four months afterwards; they are exempt from acting as guardians to minors; they are admitted gratuitously to the hydrographic schools established for the instruction of those desirous of attaining the higher grades of the merchant service, and while on active service they are allowed to travel at one-fourth the usual rates.

CONDITIONS OF ADMISSION TO A COMMAND IN THE MERCHANT SERVICE.

No one can be admitted unless he is twenty-four years of age on or before the 1st of July of the year of the examination. He must show sixty months of actual sea-service either in a man-of-war or a merchant-man. The certificate of birth, their services, and a certificate of good conduct, attested by the mayor of their place, and *visé* by the commissioner of the *inscription maritime*, must be shown. Captains going on long voyages can only be required for service in the capacity of *en-*

seigne de vaisseau (auxiliary). The masters of coasting vessels can only be taken for service in the grade of *quartier-maître.* Every one of the *inscription maritime* is entitled, after twenty-five years of sea-faring and after having attained fifty years of age, to a pension, whether he has done any actual service to the state or not.

VOLUNTEERS.

The minimum age at which a volunteer can be taken is eighteen, unless he comes from the boys who have passed through the training ship Austerlitz. The maximum age for young men who have not been in the public service is twenty-four, but for musicians, firemen, carpenters, sailmakers, and calkers, who had five years' service, it is extended to thirty. For the machinists' corps the limits are from eighteen to twenty-five. No one can be enlisted out of France.

CHAPTER II.

THE MARITIME ARRONDISSEMENTS.

The whole of the French coast is divided into five *arrondissements maritimes*, each of which is under the command, as far as regards naval affairs, of a vice-admiral, *préfet*. The first takes in the ports and coasts of the channel from the frontier of Belgium to Cherbourg, inclusive; the second extends from Cherbourg to the river Belon; the third, from the river Belon to La Roche; the fourth, from La Roche to the Spanish frontier; the fifth includes all the coast of France washed by the Mediterranean, with the adjacent islands. Cherbourg, Brest, Lorient, Rochefort, and Toulon are the *chefs-lieux* or headquarters of these arrondissements, respectively.

Under the *préfet maritime*, who has general command, is the "*majorité générale*," at the head of which is the "major-general," a rear-admiral. This latter is the executive officer of the arrondissement, and has under him the dock-yards, vessels in ordinary or fitting out, and, in fact, superintends all the details of the departmental work.

Each *arrondissement* is divided into two, sometimes three, *sous-arrondissements*, having secondary ports as their headquarters, or, as the official designation puts it, *chefs-lieux*. Dunkerque and Le Havre in the first, St. Servan in the second, Nantes in the third, Bordeaux in the fourth, and Marseilles and Bastia in the fifth, are the headquarters of these. The head of the service in each of these is a commissary of high rank, unless there may be unusual cases of construction or fitting out, in which cases the authority of the place is turned over to an "*officier de la marine*," a phrase corresponding to "line officer," or to an officer of engineers. (The word "engineer," as used in the French service, being somewhat analogous to "engineer" as used in the army; all those whom we designate engineer officers in our own service being termed *mécaniciens*.) In exceptional cases the "chief of service" in the secondary port may correspond directly with the ministry, otherwise all his correspondence must be with the *prefet maritime* of his arrondissement.

The *sous-arrondissements* are divided into *quartiers*, *sous-quartiers*, and *syndicats*. The functionaries charged with the interests of the navy in these have the title of commissioners of the *inscription maritime* in the first, of administrators in the second, and of syndics in the third. The

marine *gens-d'armes*, the *gardes-maritimes*, and the inspectors of fisheries are attached to the *quartiers*.

At Brest and Toulon are established divisions of the first class. At Cherbourg, Lorient, and Rochefort, divisions of the second. These divisions are commanded by *capitaines de vaisseau* (post-captains). There is in each division a council of administration charged with all the duties of the division, as looking after the clothing, pay, &c.

Each division of the first class is composed of a staff and of depot companies, as follows: 1 company of *matelots-canonniers*; 1 company of *matelots-fusiliers*; 1 company of machinists and firemen; 3 companies of *inscrits-maritimes*; 1 company of recruits (voluntary or conscripted).

The divisions of the second class are composed as follows: 1 company of *canonniers*, *fusiliers*, &c.; 2 companies of *inscrits-maritimes* and recruits. Each company is divided into two sections. The division of Lorient comprehends also a battalion of *apprentis-fusiliers* under instruction.

There is established in each division an elementary school, a school of accounts (or bookkeeping) for clerks, a gymnasium, a fencing school, and a school for swimming. There is in each of the two first divisions a music school, and in the division at Rochefort a normal school for the preparation of naval schoolmasters. The men are quartered in barracks on shore—modern constructions built especially for this service. This method of quartering them gives some great advantages in the way of health and comfort, and better means of pursuing discipline than is afforded on board a receiving-ship.

The divisions afford excellent means for some preparatory drill before the men are embarked. There is of course a constant flow of men through them—*inscrits*, volunteers, and conscripted men; and as the two latter classes are, on their first service, entirely ignorant of sea-faring, they are here gotten well into shape before going afloat.

CLASSIFICATION OF MEN.

The petty officers and men are divided under the following heads:

Designated as specialties:

1. Manœuvre.
2. Canonnage.
3. Mousqueterie (or fusiliers).
4. Timonerie.
5. Mecaniciens.
6. Fourriers.

Designated as professions:

7. Charpentage.
8. Voilerie.
9. Calfatage.

The men of class 1 are those whom we should designate "blue-

jackets"; class 2 are seamen-gunners; class 3 have no corresponding branch in our own service; they are on board ship in the place of marines, the marine infantry and artillery being either employed on shore in France or in the colonies; this class, while at sea, do the duty of sailors; but at all times, at sea or in port, the sentries and guards are furnished from amongst them. The usual proportion of these men on board is one-fifth the entire crew.

Class 4 are quartermasters and helmsmen.

Class 5 are machinists and firemen.

Class 6 are clerks.

Class 7 are carpenters.

Class 8 are sailmakers.

Class 9 are calkers.

As in some cases the use of the English equivalent would occasion confusion, terms such as *manœuvre* and *timonerie* will be used instead of the translation. Though some of the men of the *timonerie* correspond to our quartermasters, the French "*quartier-maître*" conveys a very different meaning.

The ratings in the classes given above are as follows:

1. Premiers-maîtres, capitaines-d'armes.
2. Maîtres, sergent-majors.
3. Seconds-maîtres, sergents-d'armes, sergents-fourriers.
4. Quartiers-maîtres, caporaux-d'armes, and caporaux-fourriers.
5. Fourriers-ordinaires.
6. Matelots (seamen), first, second, and third class.
7. Novices and apprentis-marins.
8. Mousses, or boys.

There are other ratings which do not especially regard the men whose training is to be spoken of, such as nurses, storekeepers, &c., which need not be mentioned.

The ratings of *capitaine-d'armes*, *sergent-major*, *sergent* and *caporal d'armes* are only given to the men of the *fusiliers;* the *capitaine-d'armes*, besides being the first of the non-commissioned officers of this part of the force aboard, is also the master-at-arms of the ship. The various ratings of *premier-maître*, *maître*, *second maître*, *quartier-maître*, are common to each of the other classes into which a crew is divided.

There is also a class termed *gabiers*-(topmen) *brevetes*, or seamen who receive a brevet for aptitude and ability, which bears with it an additional pay of four and five cents a day, these being brevets of the first or second class. There are also pilots of the first and second class, who are carried by ships serving on or near the French coasts as part of the crew; these, however, have more the position of a warrant officer than of a petty officer.

NUMBER OF MEN EMPLOYED.

A tabulated statement of all the persons attached to the naval service and under the direction of the ministry of the marine will be found in

the appendix. The total shown in that amounts to 103,152, but only 35,683 are persons going to make up ships' companies (exclusive of officers). Of this number 25,638 are serving afloat, on foreign stations, on special service, or in school and training-ships; 6,250 men are in the squadron of evolution (or home squadron) alone. All the foreign squadrons of the French service are small, excepting that of the South Atlantic and that in China and India, each of which has about 1,200 men.

There are (besides the 1,607 reserves of this year) 8,436 men ashore, distributed as follows:

Sub-officers, petty-officers, and seamen necessary as *cadres* for the five divisions	1,404
Under instruction ashore (in specialties)	1,566
Awaiting instruction (to take the place of the above)	518
Non-availables (on leave, sick, &c.)	938
Men available for sea service	4,000

To repeat somewhat, we thus have the men taken first from those enrolled in the *inscription maritime;* secondly, from those who volunteer; and, finally, if these two classes are not sufficient, from those obtained by conscription. They are sent to one of the five permanent divisions, where they are drilled and put into shape for sea service. Such as are fitted for special training are selected and sent to the division of Brest. As vacancies occur on board the Bretagne these selected men are sent to her, and undergo the training given *in extenso* further on. From the Bretagne they are, if destined to be topmen (*gabiers*), sent to the two cruisers used as training-ships; if to be *fusiliers*, to Lorient for drill; if gunners, to Toulon. These specially trained men are very apt to remain as continuous-service men.

Brest is the great center of the French training system. There are there the school for the sons of seamen (termed *pupilles*), established ashore; afloat, are the Austerlitz, in which is trained the boys (*mouches*) until they are sixteen, and the Bretagne, a superb specimen of the old steam line-of-battle ship, which takes on board the men I have spoken of above, and also the boys from the Austerlitz after they have been passed out.

There is also here the Borda, the ship serving as a training establishment for naval cadets.

CHAPTER III.

THE ÉTABLISSEMENT DES PUPILLES.

This school was established at the instance of the Empress Eugenie, by a decree dated November 15, 1862, for the purpose of receiving and training for the naval service the sons of sea-faring men, those of the men in the marine infantry or artillery, or marine gendarmerie, and of the workmen employed by the Navy Department. The fathers must either have died in the service or have served their time for pension The naval and merchant services are placed on the same footing; those belonging to the latter being of necessity of the *inscription maritime.*

The boys are divided into three classes:

1. The children of persons of the *inscription maritime.*
2. Those of the marine infantry, artillery, or gendarmerie.
3. Those of the men employed in dock-yards.

The number at present in the school is 400.

Those whose parents are both dead are received as early as seven years of age; those having a father or mother still living cannot be received until they are nine. All those entered remain in the school until they are thirteen years old, when they are transferred as *mousses* to the Austerlitz.

SCHOOL BUILDINGS.

The place was built for a hospital, but answers the purposes to which it is now applied very well. It is large and roomy, has two large courts, one of which is used as a drill-ground, and is on high ground in a pleasant part of the city. At one end of the drill-ground is built a ship, from the spar-deck up, which is used as a drill-ship for the boys. The school rooms and dormitories are airy, clean, and comfortable; the size of the latter varies, the boys being thus divided as to sleeping accommodations more by the size of their dormitories than by the divisions to which they belong. In each of the larger dormitories two of the seamen-instructors sleep, and in the smaller, one. The bedsteads are of iron and the bedding all that could be desired.

The lavatories are in the open air, being merely a number of faucets ranged along a wall on one side of the larger court; there are no conveniences whatever else for the usual daily ablutions. There is a bath room, however, with four bath-tubs and a shower-bath, where each gets a bath once a fortnight.

A large shed-like building on one side of the court is used as a gymnasium; having a low roof, and no windows on one side, it is very hot and uncomfortable in summer. There are several large rooms used for teaching knotting and splicing, and for the display of models.

The commanding officer, who is a *capitaine de frégate* (commander), and his lieutenant, who is a *lieutenant de vaisseau*, have their quarters in the school buildings.

The other persons attached to the establishment are as follows:

1 assistant paymaster or commissary.

1 clerk to same.

8 brothers of a religious order, who serve as instructors in school work.

1 chaplain.

1 physician.

5 sisters of the order "*De la Sagesse*," who have charge of the clothing, infirmary, and the food of the pupils.

2 premiers-maîtres.

5 second-maîtres.

8 quartiers-maîtres.

2 quartiers-maîtres, with brevets from the school of gymnastics.

16 matelots brevetés. The last five classes named are the seamen instructors.

2 drummers and fifers.

1 barber (sailor).

5 assistant cooks (sailor).

5 tailors (sailor).

5 shoemakers (sailor).

2 orderlies.

1 armorer.

2 clerks.

1 storekeeper.

1 cook (chief).

1 porter.

A total of sixty-one.

ORGANIZATION.

The pupils are divided into two watches; each watch into two companies; each company into two platoons; each platoon into two sections; each section into three series. There are thus about eight boys in each series. These different divisions have the following persons in charge:

The watch, a premier-maître.

The company, a second-maître.

The platoon, a quartier-maître.

The section, a seaman-instructor (breveté).

The series, a pupil chosen for good conduct without distinction as to size or height.

For school instruction they are divided into classes numbering not

more than 60 each. The instruction embraces reading, writing, the first rules of arithmetic, elementary grammar, elementary geography, the elements of French history, and religious instruction.

The instructors belong to a religious brotherhood, and are not permanent, as they can be changed from time to time by the order to which they are attached.

METHODS OF INSTRUCTION.

They pursue a method of individual instruction not so effective, I think, as the methods pursued in English schools. I went through the school-rooms of all the classes, and observed the recitations, and saw samples of the pupils' work. They were well advanced for boys of their age, and their writing was particularly good. There is no pressure put on them whatever. Singing is also practiced.

The seamanship and military education comprise exercise with the sails on the stationary ship, knotting and splicing, the compass, swimming; the school of the soldier, battalion exercises, and gymnastics. Great-gun and howitzer drills are taught. One large room is fitted as a battery, ports being cut in the walls. The howitzers used are the mountain howitzer of the French service, being lighter than the usual naval gun.

The routines of exercises are appended. Of course in the many years of drill these children have to undergo (six for many of them) they become quite perfect. The exercises on board ship are confined to loosing making, and furling sail, as they are not strong enough to handle spars They leave this school at the age at which a boy is put into the seamanship division at the Greenwich Hospital School (13). The gymnastic exercises were excellent. They are superintended by men who have passed through the gymnastic school at Joinville le Pont, near Paris, a school under the control of the army, but to which a certain number of petty officers are yearly sent from the naval service, who, after receiving their certificates, serve as instructors in the divisions and in the other schools ashore. The gymnastic apparatus here is not very complete, the exercises chiefly consisting in movements of the arms and body, without the aid of apparatus; the boys are too young for very severe exercise.

CLOTHING, MESSING, ETC.

The messes have about twenty boys in each. The mess furniture is exceedingly plain, being but a pan, cup, and spoon; a knife is also allowed but no fork. The kitchen and food are under the charge of one of the sisterhood, who has under her several cooks and other assistants The infirmary is also, as well as the clothing and bedding, in charge of these sisters, of whom, as before noted, there are five. This may seem an unusual arrangement to us, but women in France occupy a much more prominent position in business organizations than with us. They are frequently the heads in the counting rooms, and have large and responsible duties nearly always elsewhere assigned to men.

The entire charge of the clothing of this establishment is in the hands of one of these sisters, by whom the supply, repair, &c., are admirably arranged. Five seamen-tailors and five shoemakers are under her, who are given constant employment in repairing. The clothing allowed is all furnished ready made from the government workshops.

The food is good and wholesome. Six times a week they have fresh meat (5.3 oz.), either beef or veal, and on Friday 6 oz. of fresh fish are allowed. Twice a day they have soup. The breakfast is simply coffee and bread; twenty-four ounces of this latter are allowed daily. In spite of the liberal scale on which they are fed the boys seem very deficient in physique, and complaint is made on board the Austerlitz that they are not equal in size to the other boys they receive of the same age. I notice too that a majority suffered from bad and weak eyes, showing scrofulous constitutions, partially inherited no doubt, partially developed by insufficient food and care when very young. In this respect they did not compare favorably with the splendid physique and healthy look of the Greenwich boys, who come from the same class.

Daily routine.

	Summer.	Winter.
Rise	5.30	6.00
Breakfast	5.45	6.15
Make beds and clean up	6–0.30	6.30–7.00
Wash and dress (change linen Thursdays and Sundays)	0.30–7.00	7–7.30
Inspection by the "maitres"	7.30	7.30
School studies	8–10.15	8–10.15
Dinner	10.30–11.00	10.30–11.00
Recreation	11–12.00	11–12.00
Exercises (professional)	12–1.15	12–1.15
School (interrupted by "tea" from 3½ to 4)	1.30–4.45	1.30–4.45
Recreation	4.45–5.15	4.45–5.15
Exercises (professional)	5.15–6.15	5.15–6.15
Recreation	6.15–6.45	6.15–6.30
Supper (followed by prayers said by the sisters)	6.45–7.15	6.30–7.00
Recreation	7.15–8.00	7–7.30
Turn in	8.00	7.30

On Thursdays, in summer as well as in winter, mass is said at 8, followed by religious instructions given by the chaplain; after which there is recreation until dinner. The afternoon school is replaced by a "promenade," which may be prolonged to 6 in summer and to 4 in winter.

On Saturdays there is no exercise. In the afternoon the boys are employed in cleaning the establishment.

On Sundays there is prayer at 7.45; religious instruction until 8.15 by the "brothers" in the school-rooms; inspection at 9.30; mass at 10.30; after which dinner and recreation; at 1 a "promenade" is allowed. In this they are accompanied by their instructors.

Routine of exercises.

Day.	Practice.	From noon to 1.15.	From 5.15 to 6.15.
Monday	Seamanship.	Starboard watch	Port watch.
	Infantry	Fusiliers (port)	Fusiliers (starboard).
	Gunnery	Gunners (port)	Gunners (starboard).
	Gymnastics.	First and second classes (port) and those of second company unemployed.	First and second classes (starboard) and those unemployed of the third company.
	Compass, &c.	Those unemployed of fourth company.	Those unemployed of first company.
Tuesday	Seamanship.	Port watch	Starboard watch.
	Infantry	Fusiliers (starboard)	Fusiliers (port).
	Gunnery	Gunners (starboard)	Gunners (port).
	Gymnastics.	First and second classes (starboard) and the unemployed of first company.	First and second classes (port) and those unemployed of fourth company.
	Compass, &c.	The unemployed of third company	The unemployed of second company.
Wednesday	Seamanship.	The gunners of port watch, the second class in gymnastics (both watches), and all not otherwise employed.	The gunners (starboard watch), second class in gymnastics (starboard), and all not otherwise employed.
	Infantry	The fusiliers (port) less than 12½ years of age.	Fusiliers (starboard) less than 12½ years of age.
	Gunnery	All the port watch above 12½	All the starboard watch above 12½.
	Gymnastics.	Fusiliers and gunners (starboard)	Fusiliers and gunners (port).
	Compass, &c	Second class in gymnastics (starboard).	Second class in gymnastics (port).
Thursday	Compass, &c.	All above 12½ years of age (both watches).	
Friday	Seamanship.	All not otherwise employed	All not otherwise employed.
	Infantry	The battalion	The battalion.
	Gunnery	First class (both watches)	First class (both watches).
	Gymnastics.	First and second classes (both watches).	First and second classes (both watches).

Days.	Exercise in boats.	Music and singing
Monday	Old entries (port)	New entries (both watches).
Tuesday	Old entries (starboard)	Same.
Wednesday	New entries (starboard)	Old entries.
Thursday		New entries.
Friday	New entries (port)	Old entries.
Saturday		Same.

CHAPTER IV.

THE AUSTERLITZ.

This ship, a large two-decker, has on board the boys (*mousses*) who are under training. The number allowed is 800, and these must be the sons of sailors; *pupilles* (from the school just spoken of); or, in default of a sufficient number not being obtained from these, sons of men in the marine, infantry, artillery, or gendarmerie; sons of soldiers; and finally, if the supply from the foregoing classes is not sufficient, boys from civil parentage may be admitted.

The limits of age are from thirteen to fourteen. The applications for admission are addressed to the commissioners of the *inscription maritime.* After undergoing an examination at the headquarters of their arrondissement, they are forwarded to Brest, where they undergo a final medical examination before being received. They must be, at thirteen, 52 inches in height; at fourteen, 54 inches, and of good constitution.

The entries take place four times a year, the 1st of January, 1st of April, 1st of July, and 1st of October. No admissions take place except to fill vacancies, occasioned by the transfer of boys to the training-ship La Bretagne.

The boys are kept on board the Austerlitz until they have attained the age of sixteen, at which age, if willing, they are entered for service until twenty-one years of age. If unwilling, the parents (whose consent to their admission to the school itself is required) are obliged to reimburse the state for all the expenses of the boy while attached to the school. This reimbursement must precede the sending back of the boy to his family.

The instruction given on board the Austerlitz comprises an elementary school education, and special drills for those who appear fitted for the "*specialités*" of the service. There is also a school for a certain number of boys who are destined to serve as engineers (*mécaniciens*), if they are able to pass the examinations. This latter school embraces elementary mathematics and drawing, in addition to a higher class of education than that given the boys in general.

For the purposes of drill, &c., there are four companies, of two hundred each. These companies are constituted as follows:

1 lieutenant.

1 premier-maître.

1 maître.
1 second maître de manœuvre.
1 clerk ("sergent").
2 quartiers-maîtres de manœuvre.
1 quartier-maître de timonerie.
1 quartier-maître of gunnery.
4 topmen (brevetés).
1 timonier (breveté).
1 clerk.

These companies are divided into divisions, platoons, sections, and finally series, there being 48 series of four boys each.

There is school every morning from 8 to 10, one of the lower decks being fitted with benches and desks for the purpose. The remainder of the day is devoted to exercises, as shown by the routines which I append.

In fine weather one company, and sometimes two, are sent on board the brigs Nisus and Mousse, which are attached to the Austerlitz. The companies, numbered 1, 2, 3, 4, take in turn each of the duties shown in the first column, and designated Nisus and Mousse (the brigs), interior, and boats; there is a fifth detail, consisting of new entries (*nouveaux*), which is given special instruction.

[With two companies on board; two in the brigs.]

Companies.	From 11.15 to 12.30.	From 12.45 to 2.15.	From 2.30 to 3.45.
Nisus and Mousse	Boats get under way and exercise until 2.30. The companies then return and are allowed to overhaul their clothing until 4.50.		
Interior	Exercise aloft. Afterwards— First division, great-guns. First division, small-arms.	Knotting and splicing. The timoniers at signals.	First division, great-guns. First division, small-arms.
Boats	Boats. Sailmaking for those who have not completed the course.	Topmen at gymnasium and boxing. Sailmaking.	Compass and lead. Sailmaking.
New entries	Go aloft.	Pulling.	Knots and splices. Nomenclature.

[With three companies on board; one in a brig.]

Companies.	From 11.15 to 12.30.	From 12.45 to 2.15.	From 2.30 to 3.45.
Nisus	Gymnasium and boxing.	Exercise aloft.	Boats. Sailmaking.
Mousse	Gets under way and exercises until 3 o'clock.		Return on board and overhaul bags until 4.50.

[With three companies on board; one in a brig—Continued.]

Companies.	From 11.15 to 12.30.	From 12.45 to 2.15.	From 2.30 to 3.45.
Interior	Exercises aloft. Afterwards—First division, great-guns. First division, small-arms.	Knotting and splicing. Timoniers at signals.	First division, small-arms. First division, great-guns.
Boats	Boats. Sailmaking.	Topmen at gymnasium and boxing.	Compass and lead. Sailmakers at sailmaking.
New entries	Go aloft.	Pulling.	Knotting and splicing. Nomenclature.

When the weather is bad no company is sent to the brigs, but the company whose turn it is to go is drilled aboard the parent ship.

There is, in addition to what is here shown, school for an hour and a half in the afternoon for those who are especially backward.

The preceding routine is for winter, but it in no wise differs from that for summer except that the summer exercise is extended to 3.55 p. m.

No boy is kept on board the Austerlitz beyond the age of sixteen. He is then, if willing to enlist, transferred to the Bretagne for further instruction. If unwilling he is, upon the payment of the expense the state has been subjected to in training him, returned to his parents. A boy beneath the age of eighteen cannot be bound to the service without his own consent.

The ration allowed on board the Austerlitz is the harbor ration allowed the seamen, except that the quantity is slightly reduced. The French have three rations—for shore, harbor, and sea. I give the two last, for comparison with our own, or with that given the boys under training in the English service.

Harbor ration of the French service.

		Whole quantity allowed.	Amount to each meal.			
			Breakfast.	Dinner.	Supper.	
Fresh bread	ounces	26.5	8.8	8.8	8.8	
Brandy or rum	pints	.1	.1			None allowed to boys.
Wine	pints	.8		.4	.4	
Coffee	ounces	.7	.7			
Sugar	ounces	.9	.9			Sunday, Tuesday, Wednesday, Thursday, and Saturday.
Fresh meat with	ounces	10.6		10.6		
Green vegetables	value	$0.004		$0.004		
Cheese with	ounces	2.8		2.8		Monday.
Pease	ounces	2.2		2.2		
Codfish	ounces	4.2		4.2		Friday.
Potatoes with	ounces	14.0			14.0	Sunday, Monday, and Friday.
Green vegetables	allowance of	$0.002			$0.002	
Dried beans	ounces	3.5			3.5	Twice a week.
Dried pease	ounces	4.2			4.2	Twice a week

Butter, 1 ounce allowed for each dinner of codfish; 4 ounces for each supper, with dried vegetables or with potatoes; 2 ounces for each dinner of cheese and pease.

Olive oil or suet may be substituted for butter.

Salt and vinegar.

Sea ration.

		Quantity allowed.	Quantity for each meal.			
			Breakfast.	Dinner.	Supper.	
Fresh bread	ounces	26.5	8.8	8.8	8.8	
or,						
Biscuit	ounces	19.4	6.4	6.4	6.4	
Brandy or rum	pints	.1	.1			
Wine	pints	.8		.4	.4	Two-thirds of this quantity allowed boys.
Coffee	ounces	.7	.7			
Sugar	ounces	.9	.9			
Salt beef with	ounces	7.1		7.1		Sunday, Monday, Tuesday, Wednesday, Thursday, and Saturday.
Pease, or with	ounces	2.2		2.2		
Dried vegetables	ounces	.6		.6		
or,						
Salt pork with	ounces	8.0		8.0		
Pease, or with	ounces	2.2		2.2		
Dried vegetables	ounces	.6		.6		
or,						
Fresh meat with	ounces	10.6		10.6		
Green vegetables	value	$0.006		$0.006		
Cheese with	ounces	2.8		2.8		Friday.
Pease	ounces	2.2		2.2		
or,						
Sardines à l'huile	ounces	2.5		2.5		
Pease	ounces	4.2			4.2	Three times a week.
Beans	ounces	4.2			4.2	
Rice with	ounces	2.8			2.8	Once a week but not on Friday.
Salt pork	ounces	2.8			2.8	

Pickled cabbage, .7 ounces for supper with dried vegetables.
Olive oil or butter, for each dinner on Fridays, and for supper when there are dried vegetables.
Mustard, pepper, salt, and vinegar.

REMARKS ON RATIONS.

The foregoing rations are not equal to those given in either the American or English services, but are better by comparison with the usual food of the classes from which the seamen are drawn. The French are altogether (in every grade of life) a far more economical people in the use of food than ourselves. I was told by French officers that the ration was found amply sufficient, and that the men throve upon it. The general economy in the way of food undoubtedly tells upon the size of the men of France, who are markedly beneath Americans, English, or Germans in point of height and physique, and much of the money which the French peasant puts into the "*rentes*" would be better expended for the food which would make him a more vigorous man.

CHAPTER V.

THE BRETAGNE.

This ship, also at Brest, receives on board the boys who have passed out of the Austerlitz, the apprentices, novices, and any others who may be selected for special training. The novices are made up of boys between sixteen and twenty, who are taken as desirable persons for enlistment. Any one who has done six months' service in a merchant or fishing vessel may make application to be received (his parents consenting, if he is under eighteen). Each one of this class who has reached eighteen, and who has done one year's sea service, may be received at once as a seaman of the third class. They must, at sixteen, be 60 inches in height; at eighteen, 61 inches. The apprentices are taken at the age of sixteen, and are bound to serve until the age of twenty-one. The boys of the Austerlitz come under this designation. The remainder of those sent to the Bretagne are young men chosen from those coming from the inscription maritime; a board of officers established at each division makes choice of these; they are then forwarded to the division at Brest, and as vacancies occur are sent on board the Bretagne.

PERSONNEL.

The personnel of the Bretagne at the time of my visit was as follows:

Commissioned officers	20
Maîtres	6
Seconds-maîtres	34
Quartiers-maîtres	177
Supernumeraries	17
Pilots	1
	255
Clerks	8
Apprentis gabiers:	
Seamen, Apprentices, Novices	250
Apprentis canonniers:	
Seamen, Apprentices, Novices	354
Apprentis fusiliers:	
Seamen, Apprentices, Novices	550

Apprentis timoniers:	
Seamen	216
Apprentices	
Novices	
Total under instruction	1,378
Officers and instructors	255
General total	1,633

The instructors are divided as follows:

Seamanship instructors	65
Gunnery	32
Musketry	26
Timonerie	20
Gymnastics	2
Singing	1
Schoolmasters	6

Notwithstanding the large number on board, they seem comfortably quartered, the ship being the largest and finest wooden ship ever put afloat, exceeding in size the largest English three-decker.

The men are divided into six companies, each under the command of a lieutenant de vaisseau, and an ensigne de vaisseau, with the usual number of petty and non-commissioned officers to such a number. These companies take turns in doing service on board the Galatea, a frigate which serves as practice-ship. This tour of duty lasts a week, the officers and men of the company forming the only crew of the ship, the lieutenant commanding the company being the captain of the ship for the time being. With the exceptions of Sunday, Thursday, and Saturday, she is daily under way from 10.50 in the morning to 4 in the afternoon, and cruises about the Bay of Brest, which affords ample space for the purpose without going outside the entrance. The remaining five companies on board are drilled according to a routine which comprises all the duties of a sailor, but more especially those for which the men of the particular companies are destined.

ROUTINE.

Inspection takes place at 8.30; drill, from 8.50 to 9.50; school, from 10 to 11.30; dinner, from 11.30 to 12.30; drill, from 12.50 to 2.10, and from 2.30 to 3.50.

INSTRUCTION.

From 4 to 4.30 there is a general sail drill. Supper takes place at 6. On board the Galatea school is also held daily from 9.30 to 10.45, after which the ship gets under way. This teaching is elementary, of course, consisting of reading, writing, and the elements of grammar and arithmetic.

After the service on board, here lasting ordinarily four months, the men are transferred to the various places where specialties are taught;

the gunners to Toulon, the fusiliers to L'Orient, the topmen to the two cruising frigates which are used for training at sea. They cannot, of course, hope to form in these last named ships all the sailors of their fleet, but they form a large number, which serves as a base of supply for their petty officers.

THE CRUISING TRAINING-SHIPS.

These two ships take on board all men who are to be trained as topmen (*gabiers*). During the cruise of four months and a half they are subjected to constant exercise, the ships being nearly all the while at sea, extending their cruise as far as Madeira. At the expiration of this cruise an examination is passed for certificates, which are of two classes. Men may also come up for examination at any time before a board, which is always organized in squadrons on foreign service. This first examination, however, is passed before a board composed of the officers of the two training-ships. It is entirely practical, or rather practical evidence must be shown of the candidate's knowledge. Those who attain 160 marks out of a possible 200, receive a certificate of the first class; those who obtain 120, a certificate of second. Any one who attains a second class may present himself again as a candidate after six months.

There is laid down by regulations the exact examination to be passed, every detail being given. A provisional certificate may be granted by the boards organized in foreign squadrons, but the final or full certificate is only given by a board of officers organized in France, and consisting of a commander (*capitaine de vaisseau*) and five lieutenants de vaisseau, appointed by the *préfet maritime*. This commission or board is termed the permanent commission, and meets as often as it is called together by orders of the préfet. Each division has its commission of this kind. The examination is divided into twelve parts:

I. Knotting, 56 examples being laid down.

II. Splicing, 20 examples being laid down.

III. Other works (*travaux divers*), making rope, fishing-lines, tarring down, pointing, &c., 21 examples.

IV. Fitting rigging, 26 examples.

V. Exercises aloft, handing sails and spars.

VI. Questions relating to masts, yards, sails, and anchors.

VII. Tackles, purchases, &c., to be fully explained, to reeve them off, &c., 74 examples.

VIII. To explain the rigging of masts, yards, and bowsprit, 13 examples.

IX. Standing rigging, 19 examples.

X. Running rigging, 59 examples.

XI. Comprehends the more difficult points of a seaman's duties; how to reef in heavy weather; to haul down and furl a jib, blowing heavily; to repair damages, &c.; 34 examples.

XII. Comprehends the compass and helm; management of boats

duties of the lookout; the lights carried by vessels; the lead; and finally sailmaking. The candidate in this last must be able to sew a seam and repair a sail.

EXAMINATION FOR QUARTIERS-MAÎTRES.

This examination is combined also with that of the candidates for the grades of *quartier-maître*, &c., and there are seven more divisions which relate exclusively to these grades.

XIII and XIV must be passed by any one who wishes to become a captain of top (a *quartier-maître*). In these the most difficult points of seamanship are given, and all questions relating to the handling of boats, anchors, chains, and hawsers; in addition, the candidate must know how to blow a boatswain's pipe.

FOR SECONDS-MAÎTRES.

XV and XVI must be passed by any one who becomes a *second-maître*; these comprehend getting masts and spars on board, whether lying in the stream or under the shears, and (XVI) the duties of one in charge of stores.

FOR PREMIERS-MAÎTRES.*

The examination for *premier-maître* takes in everything relating to the handling of a ship; in a calm, in a gale, caught in a squall, man overboard, coming to anchor.

The last (Chap. XIX), part also of the *premiers-maîtres* examination, relates to the handling of steamers.

THE MATELOTS-TIMONIERS.

The final instruction for these men, who are destined as quartermasters and signal-men, is also given in the cruising practice-ships just spoken of. The course laid down embraces all the points likely to come up in a quartermaster's duties.

The number primarily designated to be educated is determined by the minister of marine, and depends upon the needs of the service. The number of these chosen at present is limited to 200, and this is the allowance at present maintained on board the Bretagne. In choosing these men at the barracks of the division only those are taken who can read or write, have good eyesight, and a good physique; they must also know the primary rules of arithmetic. The boys from the Austerlitz, who are selected for these duties, are chosen by the commanding officer of the Bretagne after their arrival on board his ship. While awaiting transfer at the barracks the men selected from the division are incorporated in the *compagnie des specialités*. After going on board the Bretagne they, as all others, undergo a general training in seamanship, pulling in boats, and in sailmaking, and in great-gun and small-arms exercise.

* Corresponding to warrant officers.

The special instruction while there consists in learning the compass and its uses, signals, use of the lead, and to use the signal-books (private and international). Those who are not found apt for this instruction are returned to the barracks of the division or are incorporated in another specialty. After transfer to the sea-going training-ships they undergo a more extended course of the same kind. A manual (a duodecimo of 268 pages) embodies the entire course. This is divided into lessons, which consist of a series of questions and answers, which are studied and recited upon in class. These lessons comprise all the minutiæ of the duties of a quartermaster or helmsman, nothing being too small to be noted. The character of the questions, &c., can only be known by samples, some of which I give:

Question. What should be the first care of a quartermaster when he goes on board ship as such?

Answer. He should immediately make himself acquainted with the name and appearance of all the commissioned and other officers, and of all those who have the more important duties amongst the crew, as captains of tops, cockswains, &c. He should know the order of rank of the officers and midshipmen, and also their places of sleeping.

Question. How does the quartermaster inform one of or transmit an order?

Answer. The quartermaster, whose duty it is to call an officer, opens the door of his room after having knocked, and does not enter until he has been authorized. At night he enters with a lighted lantern without knocking, and, if the person whom he is to call ought to turn out, lights immediately the candle in his room, unless he receives an order to the contrary. The quartermaster enters the steerage without knocking. If his communication is general, he speaks in a loud voice, to be heard by every one. If it is for one person only, he approaches him and gives the message to him only.

Question. How is the crew divided on board ship?

Answer. The crew is divided into series. The even series form the port watch, the odd the starboard. Each watch is divided into two divisions, each division into two sections.

Question. What is the mode of numbering the series?

Answer. Each section has an equal number of series from 1 to 5, according to the number of men on board.

	Series
First section	1, 11, 21, 31, 41
Second section	2, 12, 22, 32, 42
Third section	3, 13, 23, 33, 43
Fourth section	4, 14, 24, 34, 44
Fifth section	5, 15, 25, 35, 45
Sixth section	6, 16, 26, 36, 46
Seventh section	7, 17, 27, 37, 47
Eighth section	8, 18, 28, 38, 48

The unit number of a series is always that of the section to which it belongs. The chief of a series carries the number of his series, &c.

Question. How does one obtain the variation of the compass by an amplitude of the sun?

Answer. By taking the bearing of the sun's center when its lower edge appears to be two-thirds of its diameter above the horizon.

The above extracts may give an idea of the scope of this book, which includes questions on naval tactics, flags, and signals (as, Q. "What

does the hoisting of 'trapezium' No. 7 signify?"—A. "Recall of No. 1 whaleboat"). A great number of signals, such as this last, must be known by heart. This is not so difficult in the French service, where everything is rigidly the same in every ship to the least minutiæ. Following these are telegraphic signals and others, taking up 93 pages; then follow some questions on elementary arithmetic and geometry; the compass; on the rudder and helm; the action of the rudder; the log, leeway; the lead, lights, and light-houses; the tides and their phenomena, and some elementary notions of the steam-engine. Eleven pages are devoted to questions and answers on taking bearings, getting the variation of the compass, to apply the variation, &c. The use of charts, the care of chronometers, and the method of keeping the log complete this very far-reaching list of "things to know."

The practical examination of these men is conducted by a board consisting of the executive officer of the ship in which they are serving and of their instructors (those officers who have been specially detailed to look after the instruction in *timonerie*).

The theoretical examination is conducted by a board, of which the senior captain is president, and the other members of which are one of the executive officers, the officers charged with their instruction, and four other officers, all these being taken equally from the two ships. The officers of one ship examine the men of the other. Sixty-eight points out of a hundred are necessary to obtain a brevet of the first class, and sixty a brevet of the second. Those who have successfully passed are sent to the divisions, where they are held in readiness for service. At any time after six months, a man who has only taken a second class can apply for an examination for a first class. A board in this case, if there is no permanent board, is ordered by the *prefet-maritime*, or, if serving at sea, by the commander-in-chief of the squadron. From these men (the *timoniers-brevetés*) are taken by further examination the *maîtres* in *timonerie*, or the men who correspond to our quartermasters. No others, if there is a *timonier-breveté* on board, have a prior claim. Any one who can answer 66 per cent. of the questions in the manual certainly is fitted, as far as mere knowledge goes, for the position; and if the French quartermasters know all they are supposed to know, they are a remarkably well-informed class.

The certificates given can only be taken away by sentence of court-martial; they carry with them an increase of pay, and the holding of one entitles one to a petty officer's appointment in preference to a man not so breveted; it is the road to advancement to a position as high as that of *premier-maître*, which corresponds practically to that of a boatswain or gunner in our own service.

In these two ships there are at present under training 806 men of the topman and quartermaster class.

CHAPTER VI.

THE SCHOOLS OF GUNNERY, MUSKETRY, AND TORPEDOES.

The first order relating to the establishment of this school dates as far back as 1629, from Richelieu. It did not take shape, however, until 1676, since which time there has always been established in France either a stationary or floating school for the instruction of the gunners of the fleet.

The school is now, and has been for some years, on board Le Souverain, line-of-battle ship, near Toulon. A floating battery, armed with the heavier guns, and a brig used for gun exercise while under way, are the *annexes* of the school. The school for seaman gunners is combined with that for the officers.

The division of *apprentis-canonniers*, selected from the various divisions and concentrated at Brest on board the Bretagne, is kept at 450. They undergo from four to six months of tutelage on board the Bretagne under the circumstances previously detailed in the cases of topmen and quartermasters; they are then transferred for instruction to the school at Toulon.

STAFF.

The staff of this school is fixed as follows—

Capitaine de vaisseau, commandant	1
Capitaine de frigate, executive	4
Lieutenants de vaisseau, commanding divisions of canonniers-vétérans	2
Lieutenants de vaisseau, commanding divisions of apprentices	8
Lieutenants de vaisseau	8
Lieutenants de vaisseau, commanding the divisions of the permanent crew	2
Captain of marine artillery	1
Paymaster	1
Surgeons	2
Chaplain	1

Of the *personnel* used as instructors there are:

Premier-maître canonnier	1
Seconds-maîtres canonniers	10
Quartier-maîtres	40
Canonniers-brevetés of the first class	32

The men under instruction are the apprentices, the petty officer gunners, and the *canonniers-brevetés*, who form the divisions of *canonniers-vétérans*. These last are divided into two divisions, commanded each by

a lieutenant de vaisseau; the *cadre* of each division comprises, besides, a second-maître and four quartier-maîtres as instructors.

The apprentices are divided into eight divisions, each commanded by a lieutenant de vaisseau; there are, besides, attached to each division—

Lieutenant de vaisseau	1
Second-maître canonnier	1
Quartiers-maîtres, instructors	4
Matelots-canonniers-brevetés	4

The number on board, including officers, of whom there are 64, is 1,457. This, of course, includes the floating battery and brig.

INSTRUCTION OF VETERANS.

The instruction of the *vétérans* lasts six months, a new contingent c ing in January and July of each year; that of the apprentices lasts eight months. It is arranged that half of the number is renewed every few months, so that at no time is the whole body made up of raw recruits; though, perhaps, this term is inapplicable, as they have already undergone some training in the Bretagne.

The instruction given comprises recitations in the manual of the *matelot-canonnier;* exercise at great guns; firing; exercise with small-arms, and clearing for action. Seamanship exercises are also added to the special instruction in gunnery.

The exercises in firing take place both while at anchor and under way; the brig being used for this latter exercise. A fixed number of shots must be fired by each one under instruction; amounting in all (with great guns) to eighteen shots; eleven at anchor, and seven under way. Finally, at examination, each *apprenti-canonnier* fires seven shots, by which his gun-practice is judged.

EXAMINATION.

The examination is divided into three parts:

1st. General exercises.

2d. Questions in gunnery; nomenclature, &c.

3d. Seamanship.

In a first-class brevet, a minimum of 160 points out of 200 must be obtained; for a second, a minimum of 140 points; for the third class, a minimum of 120. Six months must pass before those of the lower classes can apply for a higher class brevet. In addition to the special ability shown in gunnery, several other things are noted in the examination sheet, such as the man's previous services (if he is not an apprentice); his attainments in reading, writing, and arithmetic; his conduct, intelligence, activity; his command over men, and *sang-froid*, &c.

BOARD OF EXAMINERS.

The examining boards are composed—

1st. In the case of the "veterans", of the commandant; two lieuten-

ants de vaisseau, commanding divisions of "veterans"; of the six lieutenants de vaisseau, commanding divisions of apprentices, and who have been longest on board.

2d. In the case of the apprentices, the board consists of the commandant, and of the eight lieutenants commanding the divisions of apprentices.

After examination, the men are forwarded to the different divisions or depots for service as needed. The certificates here obtained carry with them, to the exclusion of all other men, the right to be captains of guns, and to fill the other higher positions in the gun's crew.

The men holding these certificates can be (as in the case of those holding those of any other "specialty") temporarily or permanently deprived of them by certain forms of law. After a year in some cases, after six months in others, the certificate may be returned, and the man rehabilitated. Its possession is, however, carefully guarded, and extreme misconduct can only deprive the man of it. These regulations prevent the frequent changes of petty officers and the causeless transfers of men from one duty to another, which some years ago were an element of non-effectiveness in our own ships. A stable class of petty officers is recognized both in the English and French services as necessary to a sound organization.

The number of men passed through this school from 1865 to 1877 was 5,233, giving an average of 435 a year.

THE SCHOOL OF MUSKETRY.

This school has existed since 1856. At this time the principle was established in the French service that the entire combatant force of their ships should belong to the sailor class. Since that time the marine infantry and artillery have been used only in the colonies or in the home ports. The *cadre* of the battalion of instruction is formed from men and officers of the marine infantry. The men to be instructed in this school (established at Lorient) are chosen as are the others who belong to the specialties of the service; they undergo the preliminary course on board the Bretagne, and are then transferred to the barracks of the division at Lorient. The number in the division of apprentices, coming from the Bretagne, is 600; there are, besides these, seaman and petty officers who have already been in service, who, with the drummers and buglers under instruction, amount to 160, or a total of 760 in the whole battalion. The time allowed is five months. The nomenclature of the various arms, their use, the school of the soldier, of the company, of the battalion, the manufacture of cartridges, are taught; firing is particularly taught.

Under naval officers they are taught those things which more especially belong to the naval service, great-guns, boat-guns, pulling, &c., and the duties of sentries on board ship. Gymnastics, fencing, singing, and elementary instruction (reading, writing, &c.), complete the program.

After undergoing an examination, which takes place under the same onditions as those before mentioned, the men are distributed among the various divisions, and are in readiness for service. They form on board ship about one-fifth of the crew.

From 1856 to 1877, 15,873 men passed through this school, an average of 756 yearly.

TORPEDO SCHOOL.

This school is established at Boyardville, on the Ile d'Oleron. Though primarily dating from 1866, its present organization is of ten years' later date; in this interval not a great deal was done by the French towards the development of a torpedo system.

The school is under the command of a *capitaine de vaisseau*, who has a staff of five commissioned officers. Both officers and men are here educated in the use of torpedoes. The period of instruction for the men is fixed at six months, new recruits being sent on the 1st of January, April, July, and October, so that there is always a contingent of partially instructed men. The classes from which these men are selected are the gunners, quartermasters (*timoniers*) and machinists.. On their arrival they pass a preliminary examination, and upon this examination depends their retention; if the board considers them unfit, they are returned to general service. The use of torpedoes, their manufacture, &c., are taught, a machine-shop being established at the port.

CHAPTER VII.

PILOTS.

Pilots of the fleet are employed in the French service, taken from among men of the *inscription maritime*, under the following regulations:

1st. They must be between 23 and 28 years of age.

2d. They must show three years of sea-service, one of which, at least, must have been in the service of the state, and one in a square-rigged merchant-vessel, if they have served in any other than vessels of the navy.

3d. They must be able to read and write well; must know the four rules of arithmetic, and the first principles of the metric system.

4th. They must know how to steer, heave the lead, and be able to handle a ship under sail.

5th. They must be of good physique and have excellent sight.

All things being equal otherwise, the preference is given to men who have been masters of coasters, as they already have some notions of coast pilotage.

These men are received as apprentices of the second class, and are placed upon the two vessels used as schools of instruction. They remain here three years before their final examination, which enables them to go on board a man-of-war as a *pilote de la flotte.*

For making the selections for the apprentices, there is a board, consisting of a *capitaine de vaisseau* and four other officers, which visits successively, commencing with Dunkerque, the principal ports of the north and west. Previous to the beginning of this tour of examination, notices are posted conspicuously in all the coast towns, in order to bring the information regarding the school before as many as possible. After this examination is completed, the school-ships (which are two dispatch-boats) visit these ports, and take on board the successful candidates. Yearly examinations are held on board for the passing of the apprentices. Those who fail to pass to the first class are returned to the divisions, if they were taken thence, or are discharged the service.

Each of the school-vessels has the following personnel on board, besides those under instruction: A commander or a lieutenant commanding, one lieutenant, four ensigns, one surgeon, three pilots of the fleet, ten petty officers, and a small crew of seamen and firemen.

INSTRUCTION.

The instruction comprehends—

1st. The compass, its uses, variations and deviations, bearings, &c.

2d. Elementary navigation.

3. Finding the latitude, variation of the compass by an amplitude, laying down a course, measuring angles, &c.

4th. Arithmetic and elementary geometry.

5th. Charts, their construction and use.

6th. Tides and currents: finding time of high and low water, &c.

7th. Soundings.

8th. Rule of the road; handling boats; handling ships under sail or steam; handling anchors.

9th. Signals, lights, &c.

After having passed the first examination, two years more are requisite before being passed to a "pilot of the fleet" of the third class; after which they are forwarded to the division of the department or arrondissement from which they came.

Their position on board men-of-war is that of a warrant officer, taking rank with the boatswain, gunner, &c. (*premiers-maîtres*). They come up for examination for pilots of the second and first classes as vacancies occur.

CHAPTER VIII.

INSTRUCTORS IN GYMNASTICS — ELEMENTARY SCHOOLS OF THE FLEET—LIBRARIES, ETC.

The instructors in gymnastics and fencing, who have charge of the instruction in these branches afloat and ashore, receive their instruction at the Military Normal School of Gymnastics established at Joinville le Pont, near Paris. Officers of the navy are also admitted to this course.

The period of instruction for the men taken from those of the fleet is for one year. Contingents of *seconds* and *quartiers maîtres*, chosen from those of the most vigorous and active physique are sent on the 1st of February and 1st of August of each year, in order that there may be a mixture of new and old, the latter serving as monitors to the new entries.

Besides the exercises in gymnastics and fencing, the men have elementary schooling; exercise with small arms; lessons in swimming; anatomy; boxing, &c. The certificates are given after passing an examination before a board composed of officers of infantry of the line.

These men, after being passed through this course are used as instructors at the divisions and at all the schools of service ashore; some being also employed afloat.

ELEMENTARY SCHOOLS OF THE FLEET, AND NORMAL SCHOOL AT ROCHEFORT.

The elementary schools, established at the headquarters of each division and on board of all ships afloat and in service, are conducted by the elementary instructors who have passed through the normal school established at Rochefort since 1870. This normal school is attached to the Rochefort division, and has as its director a professor of the primary normal schools of the university.

There are two courses of this normal school yearly, to which are admitted any *seconds-maîtres* or *quartiers-maîtres* who can show before the board, composed of officers and professors at each of the divisions, the necessary amount of knowledge which is judged sufficient to enable them to attempt the course. The examination takes in reading, writing, spelling, arithmetic, and the elements of grammar, geography, and history. One of the principal objects of the school is to teach the would-be instructor how to teach. At the end of the course written and

oral examinations are passed before a board of officers and professors. A composition is part of the examination demanded, and questions upon the methods of teaching are also given. Medals of silver and bronze are given to the three first of each "course."

The course of study laid down is as follows:

Grammar, exercises in composition, &c. The recitations of each day begin by the delivery of some lines chosen from good authors, upon which questions are asked.

Arithmetic, through decimals, rule of three, square and cube root, calculation of interest, accounts.

French history to the end of the second empire.

Geography, including the drawing of maps; especial attention being given to France; its civil and military and naval departments; its coasts and frontiers; harbors and military posts.

There is one branch styled *conférences pédagogiques*, which consists in a series of lectures, with questions and answers on religious sentiment, respect due superiors, will, exactness, manner of study, politeness, bearing, conversation, letter writing, different modes of teaching, physical, moral and religious education, organization of primary schools, preparation of lessons, duties, discipline. These are the men who have the teaching to do in all the elementary schools of the service whether afloat or ashore.

The schools of the divisions are placed under a specially detailed officer. Each recruit as he arrives is examined as to his attainments, and is placed in one of the two school classes. All who can merely read or write or can do neither are classed as "illiterate," and are placed in the "course of the first degree." This course comprises reading, writing, and the four simple rules of arithmetic. The "course of the second degree" comprises, in addition to the other, the elements of grammar, history, geography, and arithmetic. The instruction of the first degree is obligatory for every *quartier-maître*, seaman, apprentice, and boy, with the exception of men who are over thirty years of age; that of the second degree is obligatory for all novices and boys; it may be taken by the others if they so desire. These same rules hold good for the schools of divisions and for men-of-war in service.

The instructors in the divisions of the first class (those of Brest and Toulon) are assisted by eight monitors; in the others, by six. These monitors are chosen from among the men of the division who are capable of teaching. Monitors are likewise selected on board ship according to the number of the crew, there being one for about every fifty of the crew. School is held daily in the divisions, excepting on Sundays and *fête* days, for at least two hours. On board ship it is held at least three days a week from 3 to 5 p. m., or, if these hours are inconvenient, others may be selected, so long as a minimum of six hours' study a week is attained. No exercise is allowed on board while school is holding.

A monthly report is sent in by the schoolmaster showing the zeal and progress of his pupils and the status of the school in general.

A series of readers, a spelling-book, history, grammar, arithmetic, and geography are published for the use of those under instruction in the divisions and in the fleet. These books are furnished the men free of cost, though in case of loss through carelessness they must be replaced by loser.

Under the present system, in the course of a few years no men will be found in the French Navy unable to read and write. The system of elementary instruction, both afloat and ashore, is evidently rigidly carried out; the returns which the ministry require to be made being such that there can be no avoidance on the part of commanding officers of their duty in this regard. Practically the whole French service is on the footing of an elementary public school in America, with an ample supply of schoolmasters, fixed hours, and an established series of text-books and course of study: the results of the system cannot fail to be most admirable.

LIBRARIES.

In each division, under the title of the "*Commission de la bibliothèque de la division*," there is a permanent consulting board, composed of the commandant of the division, commissary, major of the division (usually a *capitaine de frégate*), staff surgeon, adjutant in charge of schools. This commission has charge of the library, of the accounts, &c., and the *sur veillance* in general. It sends also to the authorities of the ministry of marine any suggestions relating to the possible increased usefulness of the library. At the ministry there is likewise a commission, having general charge of all the libraries of the service.

The librarian is appointed from amongst the retired warrant officers of the service. He is allowed, in addition to his half pay, 400 francs a year. He is pecuniarily responsible for all losses resulting from negligence. The room set apart for the library is large and conveniently placed, and is well lighted and warmed; the tables are covered with green serge; chairs are furnished, and all the small conveniences for the disposal of caps, overcoats, &c., are supplied. The hours during which the library must be open are established by the *préfet maritime* of the department. All men of the fleet, whether of the division or afloat, are allowed entry.

Organized in 1873, these libraries are rapidly increasing in the number of volumes supplied, and must be of incalculable benefit to the men who use them. There are in the barracks of the five divisions alone an average at all times of 8,000 men awaiting disposal, and, besides these, there is always a large number of persons serving on board ship, on leave, &c., to whom the library is free.

CHAPTER IX.

THE COST OF THE FRENCH TRAINING SYSTEM.

The low rate of pay in the French service, and the economical administration of the schools spoken of, might cause us to regard their system as economical. I should regard it, however, as otherwise. The boys of the *Établissement des pupilles* are retained in some cases from 7 to 13; in most cases, from 9 to 13. All those on board the Austerlitz are retained at least two years; nearly twice the length of time of those in the English schools.

The various schools spoken of (with the exception of those of gunnery and gymnastics) have in them the numbers as follows:

	Officers.	Men.	Pay in francs.
Gunnery-ship	64	1,457	743,617
Cruising training-ships	44	762	526,137
School-ships for pilots	10	122	126,998
Bretagne and annex	19	1,692	408,939
Austerlitz and annexes	14	987	269,638
Torpedo-school	46	193	393,693

The boys of the *Établissement des pupilles* receive no pay.

The clothing of the boys of the Austerlitz and of the *pupilles* costs yearly 99,800 francs. That of the men (of the entire service, excluding these boys first spoken of), 3,255,552 francs. Without rations, repairs to ships, or pay of crews and men necessarily used on board the training-ships, the yearly expense is 778,377 francs for the *pupilles* and the boys, not over four hundred of whom are supplied yearly to the navy under the present organization.

THE PRESENT STATE OF EDUCATION IN THE FRENCH SERVICE.

The latest report on this subject is dated 1878, but gives the results only of 1877. These were as follows (of the *quartiers-maîtres* and other men less than thirty years of age):

	Per cent.
Men absolutely ignorant	20
Men knowing how to read and write a little	24
Men knowing how to read and write, but not calculate	34
Men having the elementary instruction of the first degree	20
Men having that of the higher degree	2

This shows, however, a great advance on the state of instruction in 1872, and now (1879) it is still better, the men received being generally much better instructed in the public schools than formerly before entering the service. There has been of late years a great advance in the education of the public in France, and the republic is making endeavors in that direction which were never attempted by the empire.

In closing the subject of training in France, I must express my high admiration for the state of efficiency to which their various schools have evidently been brought. There is throughout the French service an aim to raise their men to the best possible condition. That this has been largely successful is shown in the admirable quality of their petty officers and other leading rates. The necessity of so training these men is clearly felt by the officers of the French Navy in general; without this widespread feeling much of the instruction given in training schools, however perfect, must go for naught.

APPENDIX.

APPENDIX.

A.

SEAMEN (BLUE JACKETS) IN THE ROYAL NAVY.

Return to an order of the honorable the House of Commons, dated August 5, 1875, for returns:

Of the number of seamen (blue jackets) in Her Majesty's Navy, specifying the number in each year of service;

Of the number of seamen who were lost to the service through desertion in the year 1874, specifying the number in each year of service;

And of the number of seamen who were lost to the service through desertion in each of the last ten years.

THOS. WOLLEY,
Chief Clerk.

ADMIRALTY, *August* 9, 1875.

Total number of seamen in Her Majesty's Navy on 1st October, 1875 (exclusive of Kroomen, 426)	29,743
Total number of seamen in coast guard on shore on 1st October, 1875	3,873
	33,616
Total number of blue jackets in Her Majesty's Navy on 1st October, 1875	19,283

The annual statistical return, completed to the 31st March, 1875, shows 27,430 engagements of continuous-service men in force (including coast-guard men on shore), their respective periods of service being as follows:

In the first year	3,741	In the eleventh year	555
In the second year	2,674	In the twelfth year	699
In the third year	2,073	In the thirteenth year	831
In the fourth year	2,120	In the fourteenth year	992
In the fifth year	1,974	In the fifteenth year	1,106
In the sixth year	1,522	In the sixteenth year	1,241
In the seventh year	1,439	In the seventeenth year	724
In the eighth year	1,477	In the eighteenth year	643
In the ninth year	1,387	In the nineteenth year	673
In the tenth year	1,001	In the twentieth year	558
Total			*27,430

but the returns in the department do not distinguish blue jackets from others.

*NOTE.—This total includes continuous-service men, other than blue jackets, serving in Her Majesty's Navy, viz:

Artificers, &c	5,762
Ships' stewards, cooks, &c	389
Coast guard on shore	2,259
	8,410

there being also a slight difference between the numbers borne on 31st March, 1875, and those shown above as borne on 1st October, 1875.

Number of seamen who deserted in the last ten years.

		Total.
In 1865–'66:		
Blue jackets	748	
Others	353	
		1,101
In 1866–'67:		
Blue jackets	707	
Others	352	
		1,059
In 1867–'68:		
Blue jackets	619	
Others	361	
		980
In 1868–'69:		
Blue jackets	583	
Others	292	
		875
In 1869–70:		
Blue jackets	682	
Others	299	
		981
In 1870–'71:		
Blue jackets	493	
Others	236	
		729
In 1871–'72:		
Blue jackets	516	
Others	194	
		710
In 1872–'73:		
Blue jackets	810	
Others	262	
		1,072
In 1873–'74:		
Blue jackets	829	
Others	232	
		1,061
In 1874–'75:		
Blue jackets	*895	
Others	283	
		1,178

H. WALKER,
Accountant-General.

B.

Boys are invariably rated at 18 (or at furthest 18½) to ordinary seamen, or to ordinary seamen second class, according to their qualifications. If there are no vacancies in the ship's complement, they are to be borne as supernumeraries; signal, bugler, and band boys are also advanced a step on arriving at the age of 18; ship's steward's boys are rated ship's steward's assistants at the same age in case they have made satisfactory progress and are qualified. Those who attain 19 years without being qualified are discharged. While in the training ships the boy receives the full pay of his class, which is six pence a day for the second class and seven pence for the first.

The following are the principal ratings in the blue-jacket class, with their pay:

	Pay per day for continuous service.	
	First enlistment.	Second enlistment.
	s. d.	s. d.
Gunner's mate	2 2	2 4
Boatswain's mate	2 2	2 4
Captain of forecastle	2 2	2 4
Captain of top	2 2	2 4
Quartermaster	2 2	2 4
Signal man	1 11	2 1
Coxswain	1 11	2 1
Leading seaman	1 9	1 1
Able seaman	1 7	1 9
Ordinary seaman	1 3	.....
Ordinary seaman, second class	1 0	.....
Signal boy	7	.....
Boy, first class	7	.....
Boy, second class	6	.....

* NOTE.—In 1874–'75, 282 of the deserters were recovered; previous to that year no returns of the number recovered have been kept. The office registers do not furnish information as to the year of service in which each of the above 895 deserters was at the date of his desertion.

C.

The following is the scale of pensions for continuous-service men in the English service:

Service.	Without badges, per day.		With one badge, per day.		With two badges, per day.		With three badges, per day.	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
After 20 years	0	10	0	10½	0	11	1	0
After 23 years	0	11	0	11½	1	0	1	1
After 26 years	1	0	1	0½	1	1	1	2
After 29 years	1	1	1	1½	1	2	1	2
After 32 years	1	2	1	2	1	2	1	2

ADDITIONS.—One penny a day for very good character throughout; 1*d.* a day if awarded good-conduct medal. Double petty time, as given below, after 10 years' continuous service, if discharged from continuous service with petty officer's rating and very good character for the last year of service; but only single time if these three conditions are not fulfilled.

All petty officers (except naval school-masters, who are specially provided for) are allowed the following additions to the rates of pensions awarded them as seamen:

For each year's service as chief, or first-class petty officer, one-half penny a day.

For each year's service as second-class petty officer, one farthing a day.

These rates are doubled, as shown by the "additions" in the above table, for certain classes of men.

A single case of imprisonment for not more than 42 days, or a single case of confinement in cells, with deprivation of time, during a period of continuous service, is not considered as breaking the continuity of service for pension and depriving the individual of the advantage of double petty time, provided he is ultimately discharged from continuous service with a petty officer's rating and a *very good character* for the last year of his service; and provided, also, that he serves in addition to time for pension a further period equal to double the time of his imprisonment or confinement in cells.

Under these regulations the highest pension which a man of a rating lower than that of a petty officer can receive is £21 5*s.* 10*d.* yearly. The pensions of petty officers under favorable circumstances may rise as high as £45 a year.

D.

THE COAST GUARD.

Under the present system nearly all the blue-jacket class of the English Navy are continuous-service men, who have been trained as boys in the training-ships. The benefits of remaining until 38 and of retiring with a good pension are so great, that the number who do not serve into a second term is comparatively small; the number of continous-service blue-jackets (including coast guard ashore) being about 19,000. Some, of course, leave at the end of the first enlistment and seek other employment; a man leaving the Navy with a good character rarely having any difficulty in obtaining a position in civil life; the character of the seamen of the service standing very high in England. Many take service in the coast guard, for which any seaman of good character is eligible who has completed eight years of service, whose age does not exceed 37, who is either a trained man or a seaman gunner, who wears at least one good-conduct badge, and is recommended by his captain. Men who enter the coast guard must renew their continuous-service certificates, and are only appointed on that condition.

The whole coast of the United Kingdom is divided into nine coast-guard districts, each district being under a captain in the navy. The nine districts are divided into 73 divisions, which are under a naval officer of or below the rank of commander as an inspecting officer. These divisions are again divided into 230 stations, each in

charge of a chief officer of the rank of warrant officer. Of course, under the present free-trade system of England, the duties of the coast guard with reference to smuggling are very light, but the system of making these men coast patrols has succeeded admirably, and one cannot help regretting that somewhat the same system could not be pursued here, making our life-saving system a part of our naval force, in which men of the navy might be employed, and affording a contingent from which men might be drawn in emergencies.

There are nine ships, termed "ships of the first reserve," employed on coast-guard service, one being attached to each district. These ships are usually of the largest class, such as the Hercules, Warrior, and Valiant, which were all in July of this year in this employment. They carry reduced crews, but in June take on board the greater part of the coast-guardsmen and make a cruise of six weeks with the channel squadron for practice.

There are also as tenders twenty-five small coast-guard cruisers and sixteen other small vessels, the latter being stationed at particular points. All these are officered by two, sometimes three, subordinate officers. These forty-one small vessels are, in conjunction with the coast patrol, the effective agents in the suppression of any small smuggling which may exist.

Groups of small and comfortable dwellings are built at the stations for the men, who occupy them with their families. The whole coast is connected by a continuous system of telegraphy, so that everything of moment is immediately reported to headquarters. This patrol is also a check on the light-keepers, reports being made as to the apparent condition of lights in sight.

At each station is a life-boat, which is manned by the men of the station, who also at all times, as record shows, are among the first to come forward to man the volunteer life-boats of the coast.

E.

Statement of vessels and men employed in the merchant service of Great Britain.

IN HOME TRADE.

Tons.	Sailing vessels.			Steam vessels.		
	Number of vessels.	Tonnage.	Men.	Number of vessels.	Tonnage.	Men.
Under 50	4,959	165,869	13,994	486	10,826	1,761
50 to 00	3,966	279,964	13,589	185	13,361	1,247
100 to 200	1,550	219,682	7,755	186	27,407	2,187
200 to 300	166	37,876	1,127	140	35,293	2,374
300 to 400	6	2,032	46	118	41,743	2,267
400 to 500	3	1,403	34	124	55,920	2,477
500 to 600	1	517	16	67	36,417	1,429
600 to 700	.....	.....	.....	31	20,030	759
700 to 800	.....	.....	.....	6	4,429	131
800 to 1,000	.....	.....	.....	2	1,829	32
	10,641	707,343	36,561	1,348	247,255	14,664

PART HOME AND PART FOREIGN.

Under 50	53	2,165	166	1	18	5
50 to 100	352	29,224	1,461	2	195	29
100 to 200	504	76,558	2,886	27	4,307	292
200 to 300	242	58,985	1,780	30	7,439	377
300 to 400	43	14,702	397	28	9,742	435
400 to 500	5	2,275	61	83	37,424	1,357
500 to 600	.....	.....	.....	55	29,962	1,030
600 to 700	1	606	16	41	26,328	820
700 to 800	.....	.....	.....	12	8,758	249
800 to 1,000	.....	.....	.....	8	9,402	239
	1,200	184,515	6,767	287	133,575	4,833

Statement of vessels and men employed in the merchant service, &c.—Continued.

IN FOREIGN TRADE.

Tons.	Sailing vessels.			Steam vessels.		
	Number of vessels.	Tonnage.	Men.	Number of vessels.	Tonnage.	Men.
Under 50	9	304	40	9	146	61
50 to 100	151	12,782	712	12	983	191
100 to 200	673	107,797	4,405	27	4,065	355
200 to 300	852	216,488	7,187	39	9,588	950
300 to 400	762	266,561	8,147	56	19,651	1,330
400 to 500	474	216,072	6,161	101	45,911	2,041
500 to 600	342	190,040	5,042	103	56,644	2,213
600 to 700	304	198,466	5,001	157	102,496	3,594
700 to 800	291	218,496	5,263	139	104,187	3,268
800 to 1,000	434	390,857	9,436	256	229,756	7,083
1,000 to 1,200	442	487,216	11,439	162	178,550	5,847
1,200 to 1,500	484	641,552	13,856	178	238,317	7,959
1,500 to 2,000	157	260,446	5,201	154	264,807	9,939
2,000 to 2,500	10	21,737	495	62	137,200	5,028
2,500 to 3,000	2	5,386	98	26	71,236	2,623
.....	.....	.....	.....	8	25,817	848
	5,387	3,234,200	82,483	1,489	1,480,264	53,330

Or a total of 20,349 vessels, of 6,096,152 tons, carying 198,638 men, exclusive of masters.

The above is exclusive of river steamers, &c.; if these are added, the totals are 24,829 vessels, 6,197,968 tons, and an estimated number of 260,000 men.

From 1872 to 1876 there was an increase of 516,005 tons and of 15,006 men.

The total amount of tonnage entered and cleared from British ports in 1876 was 134,759 vessels, 50,784,902 tons; of these vessels, 76,025, with a tonnage of 33,441,979, were British.

F.

The number of foreigners in the British merchant service has steadily increased of late years. The following figures in relation to the subject are taken from the report of the board of trade for 1877.

These men are chiefly Germans, Swedes, and Danes, who are attracted by the higher rate of pay in English ships. There are some French, Italians, and Greeks, but their number is comparatively very small.

The pay, in ships sailing between Liverpool and the United States, is 80 and 90 shillings per month in sailing vessels and steamers, respectively.

In 1851 the number of foreigners was 5,793, out of a total of 141,937, or 4.2 per cent. of the whole.

In 1860 the number was 14,280 out of a total of 157,312, or 9 per cent. of the whole.

In 1876 the number was 20,911 out of a total of 198,638, or 11.76 per cent. of the whole.

The number of men in sailing ships shows a steady decrease since 1869. This does not show a decrease in the number of ships, but the number of men carried per 100 tons has fallen steadily since 1814, owing to various circumstances, one of the most prominent of which has been the introduction of better mechanical contrivances on board ship.

In 1854 the number carried in sailing ships in the foreign trade, per 100 tons, was 3.97. In 1876 this number was but 2.55. In steamers in the foreign trade this number has fallen in the same time from 7.69 to 3.58.

The usual distribution of a crew in an English merchant ship is as follows (taking as an example a sailing ship of 1,400 tons):

Mates	2	Seamen	15
Boatswain	1	Ordinary seamen	3
Carpenter	1	Others	2
Sailmaker	1		
		Total	25

In the Shannon, royal mail steamer of 2,187 tons, employed in the West India trade, there are—

Mates	5	Boys	4
Boatswain	1	Engineers	6
Quartermasters	4	Firemen	15
Carpenter	1	Others (servants, &c.)	52
Seamen	19		
Ordinary seamen	2	Total	109

G.

In the British merchant service in 1874 and 1876—

	1874.	1876.
The total number of deaths was	4,602	4,151
Of these by drowning there were	2,859	2,270
Of these last there were drowned in shipwreck	1,819	1,237

The number of officers who died in 1876 was 551.

H.—*Statement of the personnel of the French Navy.*

	Ashore.			At sea.			In the reserve.			In the colonies.			
	Officers and others having the status of officers.	Warrant and petty officers, seamen and employés not having the status of officers.	Total.	Officers and others having the status of officers.	Warrant and petty officers, seamen and employés not having the status of officers.	Total.	Officers and others having the status of officers.	Warrant and petty officers, seamen and employés not having the status of officers.	Total.	Officers and others having the status of officers.	Warrant and petty officers, seamen and employés not having the status of officers.	Total.	Totals.
Attached to the ministry at Paris	220	40	260										260
Depot of charts and plans	16	8	24										24
Officers and men on general service.													
Line officers (*officiers de la marine*)	778		778	980		980	32		32				1,790
Professors				14		14							14
Marine engineers (*génie maritime*)	124		124	5		5							129
Hydrographic engineers	14		14	3		3							17
Paymasters (*commissariat de la marine*)	310		310	106		106	7		7				423
Surgeons' corps	404		404	191		191	5		5				600
Chaplains	8		8	16		16							24
Engineers (*mécaniciens en chef et mécaniciens principaux*)	22		22	31		31	10		10				63
Clerks, &c., of the commissariat		108	108		233	233		19	19				360
Ships' crews	2	8,436	8,438		25,638	25,638		1,607	1,607				35,683
Marine veterans		1,624	1,624										1,624
Pupilles de la marine		500	500										500
	1,662	10,668	12,330	1,346	25,871	27,217	54	1,626	1,680				41,227
Troops.													
Marine infantry	419	9,902	10,321							279	6,981	7,260	17,581
Marine artillery	297	3,241	3,538	2		2				46	1,142	1,188	4,728
Gen-d'armes	18	604	622										622
Compagnie de discipline	1	29	30							4	117	121	151
Reserves (infantry, 282; artillery, 61)		343	343										343
	735	14,119	14,854	2		2				329	8,240	8,569	23,425
Various.													
Inspectors	32		32										32
In charge of works	387	230	617							17		17	634
Accountants	99	630	729							21		21	750

In charge of bakeries	11		11										11
Examiners and professors in nautical schools	32		32										32
Engineers of bridges and roadways	62		62							2			64
Commissary clerks	645		645							4			649
Maitres principaux	65		65										65
On various services	7		7										7
	1,340	860	2,200							44		44	2,244
Maistrance et surveillance.													
Dock-yard masters of all kinds		219	219								2	2	221
In elementary schools (divisions)		13	13										13
Signal-men in charge of semaphores		283	283										283
Divers agents		564	564										564
Watchmen, porters, &c		791	791										791
Firemen		517	517										517
		2,387	2,387								2	2	2,389
Victualing establishments and hospitals.													
Clerks and workmen		1,312	1,312								65	65	1,377
Sisters of Mercy; gardeners; day laborers	134	735	869										869
	134	2,047	2,181								65	65	2,246
Workmen.													
On naval constructions 22,723; In ordnance laboratories 2,140		24,263	24,263								600	600	24,863
In civil engineer's department		770	770										770
Department of maritime justice.													
Commissioners and judge-advocates	9		9										9
Clerks	18		18										18
Watchmen		49	49										49
Prisoners		850	850										850
	27	899	926										926
Total in the naval service	4,134	56,061	60,195	1,348	25,871	27,219	54	1,626	1,680	373	8,907	9,280	98,374
Colonial service.													
Officers and agents of the civil service										747	146	893	893
Officers, non-commissioned officers, and soldiers (infantry, artillery, gen-d'armerie)										195	2,843	3,038	3,038
Connected with prisons										195	652	847	847
Total on colonial service proper										1,137	3,641	4,778	4,778
General totals	4,134	56,061	60,195	1,348	25,871	27,219	54	1,626	1,680	1,510	12,548	14,058	103,152